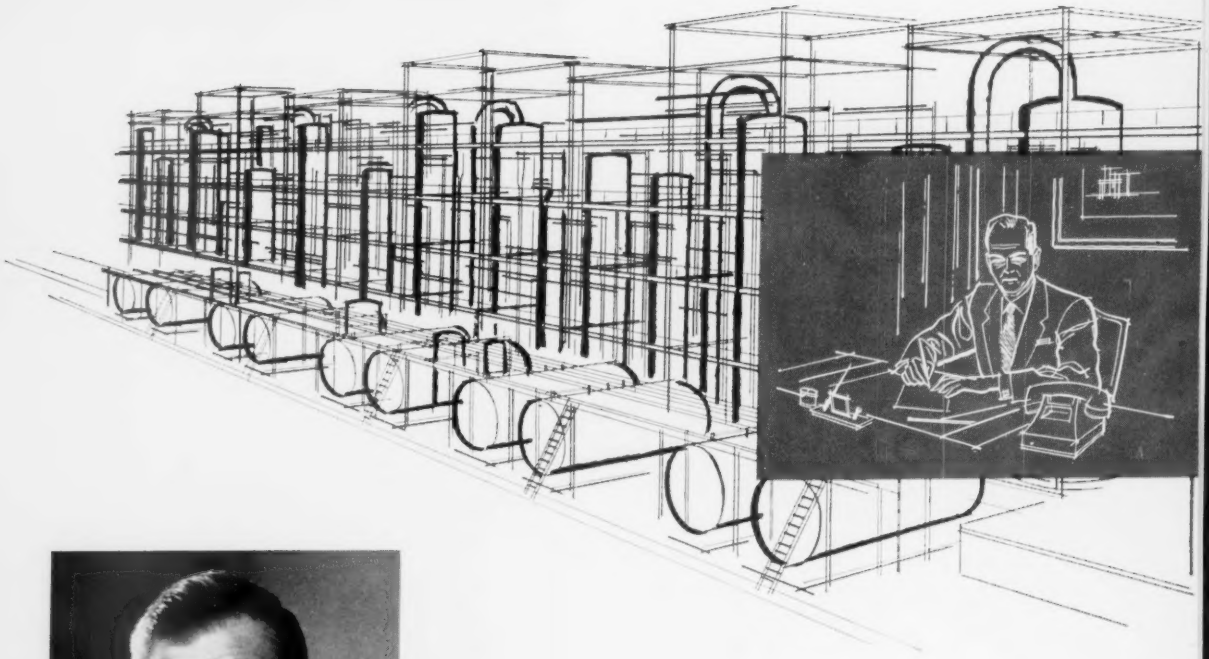
MAY, 1956

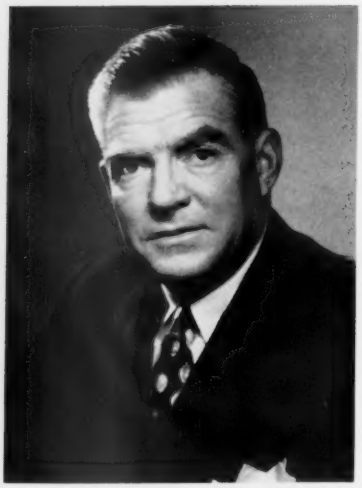
American Engineer

IN THIS ISSUE . . .

Perspective in Industrial Leadership

By HENRY B. du PONT,
Vice President, E. I. du Pont de Nemours & Co.





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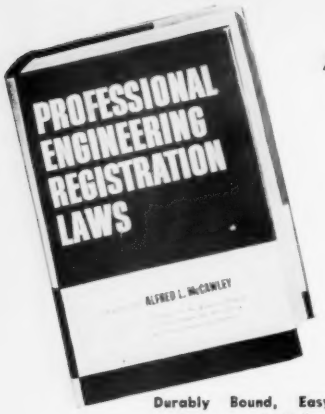

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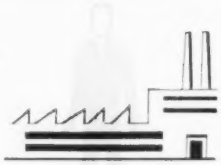

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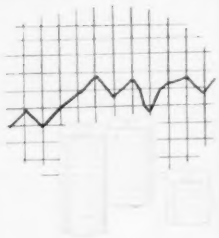

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1956

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Letters to the Editor

False Shortage? . . .

Dear Editor:

It is encouraging to note that several engineers have taken the time to write letters to the editor recently discrediting the claims by large companies that there is a shortage of engineers. These large companies have much to gain in salary savings if they can create a still larger surplus of engineers than presently exists. This is evidenced by the large financial contributions provided colleges by such companies each year—they aren't doing this out of generosity alone. Even notoriously thrifty power companies contribute generously to . . . schools and colleges in an effort to make power engineers plentiful—they believe in the law of supply and demand vs. prices.

If any engineer doubts that there are plenty of engineers available, I invite him to visit a cross-section of large companies and note the number of graduate engineers doing accounting, rate clerk duties, purchasing, and working as bench technicians.

Should a true scarcity of engineers ever develop, employers would utilize the talent which they, in general, already have on their payroll doing a lesser job.

The salaries commonly paid engineers are not nearly commensurate with the scholastic ability and integrity necessary to become a graduate engineer. If there were fewer engineers it would possibly help to restore the dignity and remuneration which so many have lost.

SAM KELLOUGH, P.E.,
Princeton, Ind.

Let's Use P.E.! . . .

Dear Editor:

I read with interest the letter by Frank G. Norris, P.E., in the March issue of the AMERICAN ENGINEER, in which he suggests the adoption of the abbreviation P. Eng. to replace the present P.E.

P. Eng. has been used throughout Canada for many years to designate a registered professional engineer. If it were adopted in the United States also it would certainly make for unanimity.

But whatever the designation finally decided upon, it is of the utmost importance in my opinion that we use it consistently, for it is only by this means that we will eventually attain the recognition by the general public that we desire.

Practically everyone knows what the letters M.D. or C.P.A. mean; for the few who do not, any encyclopedia will enlighten them. Not so with the letters P.E. Why? Simply because the thousands of engineers who are entitled to write these letters after their names do not do so.

Much has been written about the use of the title "engineer" by persons who are not engineers in the professional sense. We might as well face the fact that we have long since lost exclusive right to this title, if indeed we ever possessed it. We do, however, have exclusive title to the letters P.E. in the same sense that a medical doctor has to his M.D.

Let us not be deterred by a false sense of modesty from identifying ourselves with our learned and honorable profession. Remember that each time we write P.E. after our names we are boosting, not boasting.

ARTHUR W. EVANS, P.E.,
Armdale, Nova Scotia

AE On Capitol Hill . . .

Dear Editor:

Thank you very much for sending me a copy of the March issue of the AMERICAN ENGINEER containing Dr. Brandt's article on "The Engineering Profession in the Soviet Union." It is indeed an interesting article and one which I believe deserves wide attention. I have therefore made arrangements to have the article inserted in the *Congressional Record*.

It is gratifying to learn that the Subcommittee's report on engineering and scientific manpower will be the subject of the "From Washington" column in the May issue of your magazine. Your organization is to be commended for focusing attention on this vital problem and for stimulating interest in improving science and mathematics courses in our high schools. You are performing a real service to our country.

MELVIN PRICE, M.C., Illinois,
Member, Joint Committee on
Atomic Energy

Lauds Committees . . .

Dear Editor:

. . . I had planned to write a (longer) letter on the subject of the March AMERICAN ENGINEER but will use this note instead. The reports of the NSPE Board of Directors meeting are excellent and it is hard for me to express my enthusiasm over the dissemination of this type of information. It is a wonderful thing for every member of NSPE who will take the time to find out in considerable detail what his Society is doing. When I see the work being done by the committees . . . I am really impressed with the value of our Society.

T. E. CASSELMAN, P.E.,
Waban, Mass.

Likes April Issue . . .

Dear Editor:

I should like to congratulate (the staff) on the continued improvements to the AMERICAN ENGINEER. I am particularly im-

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pressed with the April 1956 issue.

The article, "The Time for Unity Is Now," by Mr. Walter B. Morton is the most realistic of any I have seen on the subject. It represents the kind of give-and-take philosophy that was responsible for the successful Florida unity movement which was culminated last year, and I sincerely hope it will receive widespread endorsement.

The contribution by Dean Dougherty on "A Profession of Diverse Individuals" was also excellent, and, in my opinion, is entirely compatible with the article by Mr. Morton.

JOHN E. KIKER, JR., P.E.,
Gainesville, Fla.

Registered Profs? . . .

Dear Editor:

Registration has done much to establish engineering as a profession. The wording in the Act of Congress regulating the practice of engineering in the District of Columbia, while similar to that in most of the state registration laws, is worthy of notice because of the body concerned with writing it. The Act reads in part:

"In order to safeguard life, health and property and promote the public welfare, the practice of engineering—is hereby declared to be subject to regulation in the public interest. It is further declared to be a matter of public interest and concern that the *profession of engineering* merit and receive the confidence of the public *and that only qualified persons be permitted to engage in the practice of engineering.*"

Engineers are to be found in industry and government. They are also to be found as private practitioners. Each and every one seeks to merit and receive the confidence of the public and thus should be a qualified and an accredited—registered—person. The name of the employer—industry, government, or self—should have no bearing on the specifications regarding qualifications or accreditation.

By statutory definition a "professional employee" and therefore a *professional engineer* in industry, government, or self-employment is an individual "who *has knowledge of an advanced type in a field of science*—customarily *acquired by* a prolonged course of specialized *intellectual instruction and study in an institution of higher learning*—as distinguished from a general academic education or from an apprenticeship or from training in the performance of routine mental, manual or physical processes." State boards of registration then by greater emphasis on this specification will better enable the profession of engineering to "merit and receive the confidence of the public." Industry and government by closer adherence to the spirit of the statutory definition can likewise do much to enhance the confidence of the public in the engineering profession and lastly, and not least importantly, there is need for the engineering college to require accreditation—registration—from all its engineering faculty.

A. A. K. BOOTH, M. ASCE, PE.,
Troy, N. Y.

P.E., O.K. . . .

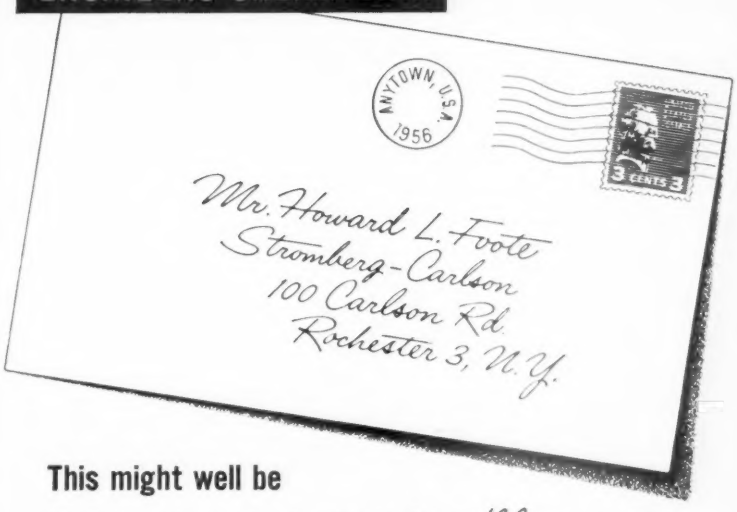
Dear Editor:

I read with some interest the article titled "P. Eng.?" in the March 1956 issue of the AMERICAN ENGINEER.

I believe I am correct in stating that in ecclesiastical circles "Protestant Episcopal"

(*Continued on page 33*)

ENGINEERS UNLIMITED...



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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Past President Forrest Endows SMU Lecture Fund

T. Carr Forrest, Jr., of Dallas, Texas, a leading consultant and a past president of NSPE, has recently presented a gift of $3,000 to Southern Methodist University for the establishment of a lecture fund.

The purpose of the gift, which will be added to the general endowment fund of the University, is to provide the means of financial sponsorship for a series of lectures devoted to the development of professional consciousness among the student engineers.

It is anticipated that leading professional engineers will participate in the program which will be known as "The Forrest Lectures." The first announcement of the lectureship will appear in the new SMU catalogue.

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Small Business Management To Be Meeting Topic

"Developing Profitable Management for Small Business" is to be the theme of a two-day conference sponsored by the Society for Advancement of Management in cooperation with the U. S. Small Business Administration. It will be held at the Hotel Statler in New York City on June 7 and 8.

The program will feature informal management workshop sessions on the most troubling problems facing the small business owner, including questions of finance, sales, employee relations, cost reduction, and executive development.

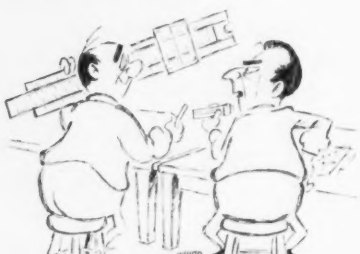
Among the principal participants will be Phil Carroll of Maplewood, New Jersey, a well-known consulting engineer and member of NSPE. Mr. Carroll will serve as chairman for the management workshop session on "Cutting Costs in the Small Business," which is scheduled for Friday morning, June 8.

The keynote address for the meeting will be delivered by Wendell B. Barnes, Administrator of the SBA. He will speak on the subject, "Small Business: Its Place and Problems."

Civil Service Boosts Beginning Engineer Pay

Entrance salaries for Grade 5 and 7 engineers and scientists have recently been raised by the Civil Service Commission. The new starting rates are $4,480 and $5,335 for Grades 5 and 7 respectively. Under the former scale, the pay was $4,345 and $4,930.

The Commission hopes, it is said, that the raise will make it easier to hire some 8,700 new scientists and engineers who will be needed by Government agencies within the next year. The CSC has the authority to set the entrance salaries of hard-to-hire people at rates above the minimum starting pay.



"Show-off!"

Lester C. Higbee Heads Surveying and Mapping Group

Lester C. Higbee, president of W. & L. E. Gurley, engineering and scientific instrument manufacturers of Troy, New York, has been re-elected president of the American Congress on Surveying and Mapping. This will be the second term as head of the Congress for Mr. Higbee, who is also a member of NSPE and the New York State Society.

Photogrammetrists Elect

William C. Cude, chief topographical engineer at Fort Belvoir's Engineering Research and Development Laboratory, has been elected president of the American Society of Photogrammetry. Kennedy E. Reynolds of Rochester, New York, has been elected first vice president, while Harry Tubis of Newark, New Jersey, is the new second vice president of the Society.

Reis To Take Part In World Power Conference

Paul S. Reis, a member of NSPE who has recently been appointed to the top position of the Quality Assurance Biological Warfare Office at Fort Detrick, Frederick, Maryland, an office of the Army Chemical Corps Material Command, will also be a participant in the Fifth World Power Conference in Vienna, Austria. The Conference will be held during June, 1956.

Roush Is Elected To Park College Board

C. G. Roush, a former vice president of NSPE, has been elected to the board of trustees of Park College, Parkville (Kansas City), Missouri, according to an announcement by Robert W. Long, president of the board.

Mr. Roush, who is Missouri Valley district manager for Westinghouse Electric Corporation, is noted for his civic as well as his professional engineering activities. He is currently a vice president of the Chamber of Commerce of Kansas City. He is also serving at present on NSPE's National Affairs Committee.

❁

Some Students Can Skip Senior Year, Study Finds

An educational experiment recently undertaken at Rensselaer Polytechnic Institute, Troy, New York, has indicated that colleges of science and engineering could successfully advance some students to graduate studies without benefit of the senior year.

This conclusion is the result of a six-week experimental program conducted at the college last summer. Ten students, who had just completed their junior year and who had been carefully screened for promise of brilliant achievement, were selected from ten colleges and universities to participate in the experiment. Their previous experience had been in physics, chemistry, and metallurgical engineering.

They were, according to Dr. Arthur A. Burr, head of the Rensselaer Metallurgical Engineering Department, required "to reach a level normally considered only within the capabilities of graduate students."

"There is no doubt among us who administered the experiment," he continued, "that approximately half of the group could easily undertake studies toward advanced degrees without further undergraduate training. The performance of all but one would have merited six credit hours of graduate work."

Dr. Burr reported further that he believed that probably five to ten per cent of the Nation's engineering juniors would be able to absorb graduate work successfully without senior-year training, if given the opportunity.

"If we could turn out that many engineers with advanced degrees in a year's less time, it would mean a great deal in today's shortage," Dr. Burr commented in discussing his just-published report on the program. Plans are under way to conduct a similar program next summer.

❁

O. H. Fritzsche Named State Highway Engineer

Otto H. Fritzsche, a 31-year veteran with the New Jersey State Highway Department, has been named to the position of state highway engineer by Commissioner Dwight R. G. Palmer. Mr. Fritzsche, who is a member of the New Jersey SPE and NSPE, is the first Highway Department employee to "come up through the ranks" to the chief engineering position.

Mr. Fritzsche is a graduate of Lehigh University. In addition to NSPE, he belongs to the Institute of Traffic Engineers, the American Association of State Highway Officials, and the Association of Highway Officials of the North Atlantic States.

(*Continued on page 45*)

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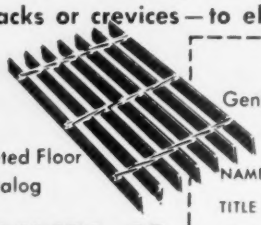

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The Magazine of the Registered Professional Engineer

VOLUME TWENTY-SIX NUMBER FIVE

"Technology's Advance Uncovers New Problems Which Demand for Their Solution a Greater and Greater Degree of Subdivision and Specialization. . . ."

Perspective in Industrial Leadership

By Henry B. du Pont,

Vice President, E. I. du Pont de Nemours & Company

A basic team in the field consists of Area Engineer William Maher, Jr., left, and General Craft Superintendent Edwin Urban, who discuss laying of pre-cast roof slabs on Du Pont expansion project.

THOSE of us who speak and write as representatives of industry sometimes are accused of being inconsistent. While we emphatically state that this is the Age of Specialization, and plead for more specialists in engineering and science, we also say that what we really want are men of broad interests, men who know and appreciate the liberal arts. Somewhat bewildered, our audience asks that we stop talking in paradox, and tell them which we want.

They have a point. But, I submit, the paradox is only apparent. Perhaps industry has failed to articulate the problem clearly, but there is no inconsistency in it. Industry is searching for specialists, yes. But it is searching for men who are more than specialists. It is looking for people to fill a need for leadership, a need that at once presents engineers with their greatest challenge and their largest opportunity. It is looking for what can best be described as specialization in perspective.

Historically, the engineer's job has been to direct the forces of nature to the service of mankind. As our store of knowledge has expanded, this job has become larger and more complex. Technology's advance uncovers new problems which demand for their solution a greater and greater degree of subdivision and specialization. Yet the greater the degree of specialization, the greater the need for perspective to balance the diverse elements in terms of the broader objective. If the individual specialties are to be focused on a common purpose, if they are not to disintegrate into a mass of isolated and insulated factions—if, in short, technology is to be a purposeful and efficient servant of man — then there must be leadership on a vast scale.

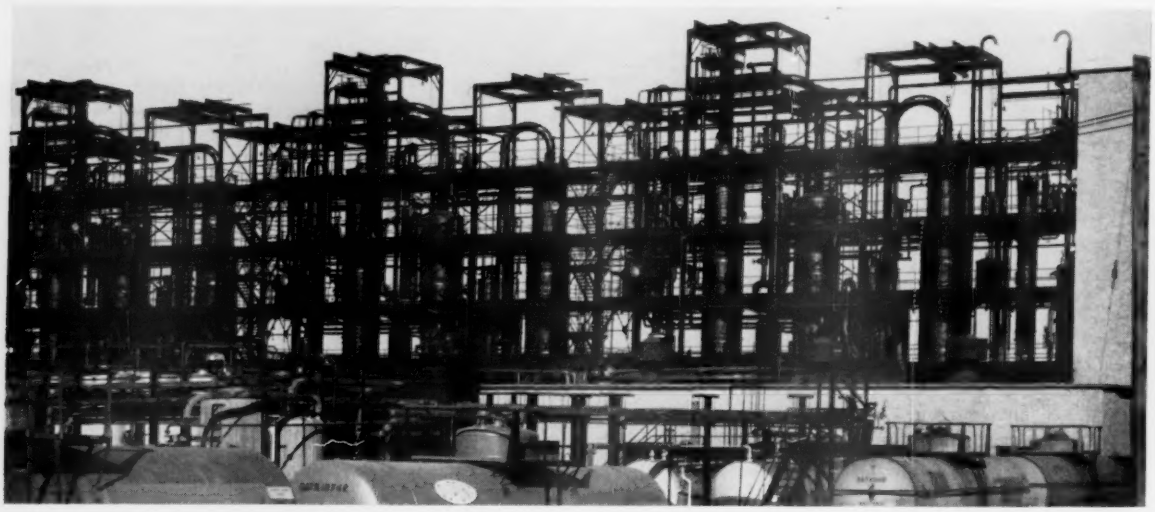
We need technical skills, to be sure. But above all, beyond the need for the engineer as a technician, we need the engineer as a leader. We must have more leaders—leaders who can think straight, who have intellectual honesty, objectivity, and a clear sense of purpose.

To an ever-increasing extent, industrial leadership calls for men who understand not only the purpose and direction of their own specialty, but its

A basic team in the office consists of Process Engineer Lester Larson, left, and Designer Fred Pfizenmayer, who work hand in glove on all aspects of incorporating the latest design and techniques into a new plant.

relationship to the rest of the industrial effort. It calls for engineers who can relate their work to the broad objectives of research and sales, of production and development, of finance and employee relations. Moreover, it calls for men who clearly see the relationship of industry to the community, and who understand the impact that our social structure and our technology have on each other.

MORE than anything else, it seems to me, this new leadership calls for perspective. Perspective is achieved when we climb up high and take a long-range look at the landscape. We see objects which we could not see at close range and some which look far different than they did at first impression. We orient each into its relative position



Du Pont's Waynesboro, Virginia, Acetate Plant is opererated from a small control room. It runs 24 hours a day.

with respect to other objects and to the picture as a whole. When a scene is simple and uncomplicated, there is less need for the view from the crow's-nest, but when the scene is crowded and alive with puzzling and sometimes inconsistent factors, the more perspective we can give it the better.

This is the point of view we need to develop, and I am afraid that we in engineering have been less attentive to its development than we should have been. This is not said in criticism. Events move rapidly, and the times demand much of the technologist. But it seems to me that we in engineering must, in the future, enlarge our sphere of interest far beyond the technical objectives which are our immediate goal.

Perspective is vital not alone to the progress of technology. It has implications that reach far beyond the realm of industry into the mainstream of national and international affairs. Technology is one of the most signifi-

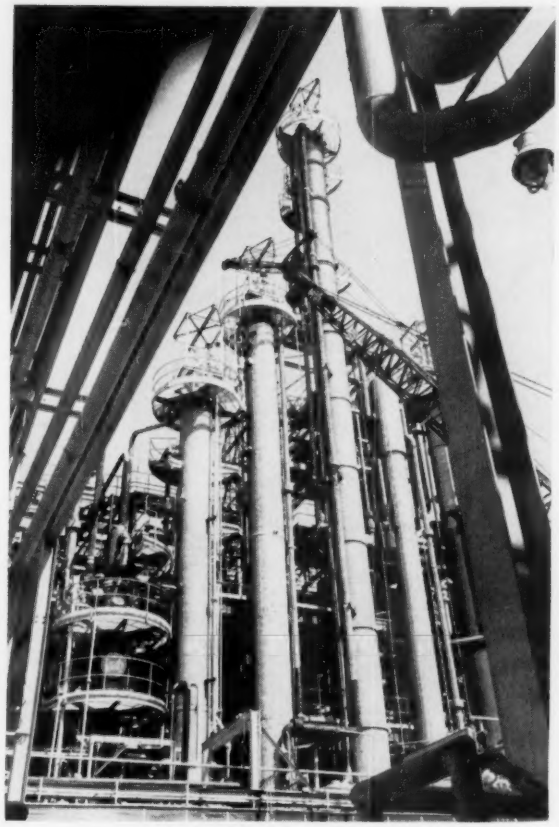
Control Panel at Du Pont's Victoria, Texas, Nylon Unit.

cant forces of our age, and it also is one of the most poorly understood. It seems odd that there should be so much controversy about so positive a force as technology, a force which has enabled the United States to build a living standard that is the envy of the world. Yet a casual glance at either the national or the overseas news gives immediate evidence of the amount of suspicion, distrust, and hostility that is being directed today toward technology. Misunderstanding of technology represents a threat to our security, both from the military and economic standpoints.

It is essential that this threat be met; and, in my view, engineers must accept much of the responsibility for meeting it. They must make it a part of their duty to bridge the gulf of misunderstanding between people, using the same ingenuity and skill they have applied to bridging the bays and rivers which once formed physical barriers between men. They must step forward and become the voices and the champions of technical progress.

They must, as well, accept a rightful measure of leadership in the conduct of the business of the nation and its many communities.

Leadership is not given; it is won. But there is no question that it sometimes is won by default. It is painfully evident that, in the civil and political affairs of the community, leadership often goes not to the most capable, but to the most willing; not to the most objective, but to the most vocal. Too often, the individual whose judgment is



The 149-foot ethylene refining unit at Du Pont's Sabine River Works, Orange, Texas, represents complete equipment in today's plants.

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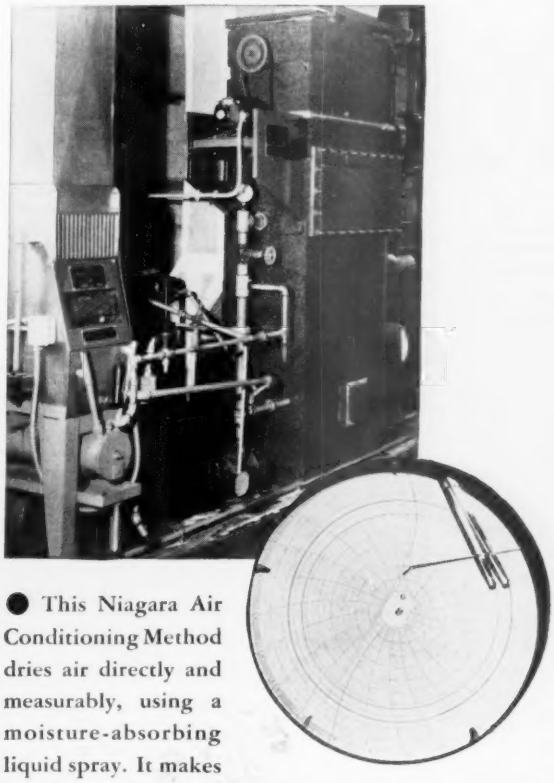

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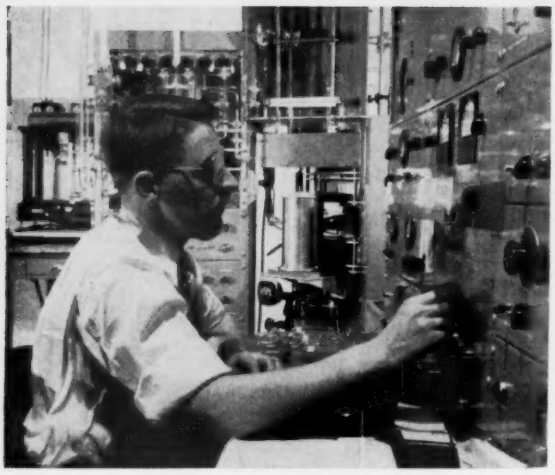
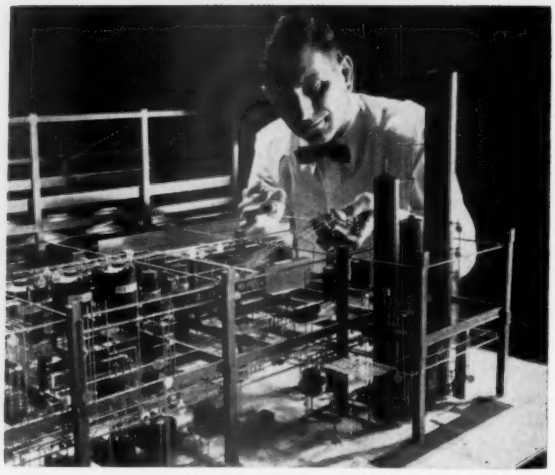
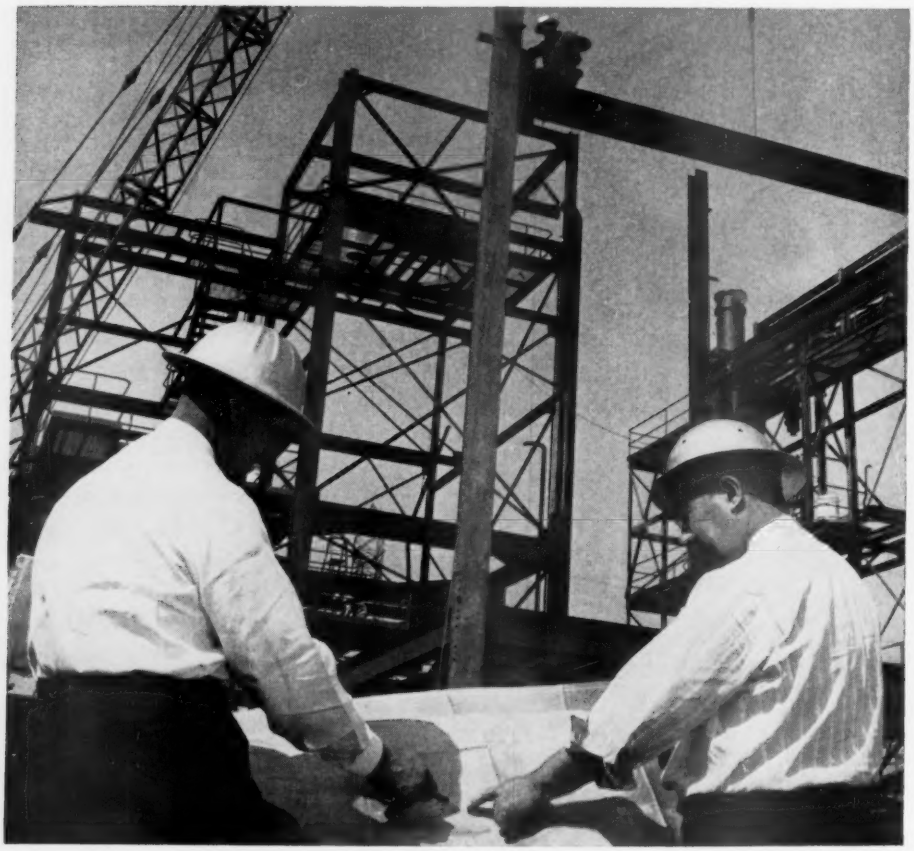


Invisible weighing is accomplished on this mass spectrometer at the Experimental Station, Wilmington. Chemist Harold Kelley, Polychemicals Dept., weighs tiny invisible masses in chemical samples, which may include more than a dozen different components.



Design and construction of new plants require more than 100 different kinds of technologists. Most of them are engineers like James Lawrence, Jr. He works in Du Pont's engineering department. This group designs and builds most of the new Du Pont facilities.



Field Project Manager Court Steelman, left, and Architectural Engineer Howard Hawthorne study a blueprint on the Pigments Department unit at Edge Moor, Delaware.

most worthy of respect turns his back on local responsibilities, excusing himself on the grounds that he is too busy, or that, as one man, he can do nothing to solve a whole community's problems. Many times the truly able man disqualifies himself as being unskilled in human affairs, and thus unsuited to public service.

This is not only poor citizenship on the part of the engineer; it is poor logic. For it is in this very area that the engineer has, by background and teaching, some especially valuable qualifications to offer. If a man develops any one faculty as an engineer, it is his reason. He learns to infer logically from premises, to distinguish the fact from the guess, to withhold judgment until the body of data makes an informed decision possible. These qualities are as valuable in civil as in industrial affairs. Possessing them, the engineer has more to recommend him as a leader than he often may realize. But he can assume real leadership only if he recognizes that his obligation goes beyond the narrow limits of his specialty, that the abilities he has so painstakingly developed can be applied to more problems than those he encounters in his day-to-day work.

Effective leadership rests upon an understanding of the forces exerted by labor, by government, by the courts, and by public opinion, just as professional engineering work rests on an understanding of the stresses and strains of physical phenomena. Without this breadth of vision, the capacity for leadership is severely limited.

THIS is the basis of perspective, and the seeds of its development should be germinated in school. By this I do not mean in the classroom alone. On every campus there is the opportunity for everyone, faculty member and student, engineer and social scientist, to broaden his thinking by exploring that of his associates. The very concept of the university is that of an institution in which various viewpoints can be studied and consolidated, in the interest of complete understanding.

While on the subject of colleges, I might say that perspective is as important to the liberal arts students as to the engineers. If the technical worker should understand the implications of history, economics, and the arts, it is equally important for nontechnical people to understand the problems and results of technology and industrial growth. Many engineering schools ask that their students include in their undergraduate work some courses in the arts and social sciences. I would not think it at all amiss to adopt the converse as well and ask the liberal arts students to have some background of technical study. It is difficult to conceive of the liberal arts as liberal unless they include an analysis of the impact and meaning of technology, one of the most pervasive and influential forces in history.

The man who thinks education is complete when the degree is granted has a poor education indeed. For he has missed its most fundamental lesson—that education is a lifelong process. The engineer who aspires to leadership must recognize that his job and his community offer as many opportunities to learn—to gain perspective, if you will—as his college.

The ability to lead is an elusive and highly individual quality, and one would be presumptuous to try to set forth comprehensive rules for its development. However, there are some guiding principles, some constants in the equation, that remain fixed. They bear analysis.

The American industrial economy was founded on individual initiative, and its enormous growth over the years has only served to strengthen the premium on that initiative. Too often, engineers assume that because they work for a large company, or in one phase of a multi-faceted operation, their opportunities for individual accomplishment and recognition are limited. Such an attitude destroys the very initiative so sorely needed.

Accountant George Becker is one of 80 who prepare the analyses of Du Pont engineering costs.

Moreover, it ignores some very important facts: Every manager worth his salt recognizes and appreciates well-thought-out and intelligently directed ambition. He has a boss, too, and is judged not on the basis of the people he holds back, but on the people he pushes forward. The more he can help subordinates advance, the better it is for him. One of management's principal responsibilities is creation of an atmosphere that will encourage people to do their best. Certainly, recognition of individual accomplishment is essential to that environment. The most effective leader is the man who can relay his knowledge and skill to his subordinates, helping them build their abilities and careers.

No manager, though, can force teaching upon a man; he can only help him learn. And here enters the simple but indispensable factor of interest. Many men never measure up to their potential simply because, once out of the office, they seldom give their jobs another thought. But the man sincerely interested in getting ahead is always curious about outside factors, and their relationship to his job. In his reading, in discussions with friends, or per-

(Continued on page 33)

About the Author . . .

Mr. du Pont

Henry Belin du Pont, a vice president, director, and member of the Executive Committee of E. I. du Pont de Nemours & Company, is a great great grandson of the founder of the Company and has been in its service since 1928. He holds an A.B. degree from Yale University. Following post-graduate work in mechanical and aeronautical engineering at Massachusetts Institute of Technology, he also received a B.S. from the latter school in 1923.

Before coming to the Du Pont Company, he was a research engineer with General Motors Corporation for four years and did financial work for the Delaware Realty and Investment Company for one year.

Mr. du Pont is president of the Board of Education of the Alexis I. du Pont School, a trustee of the University of Delaware, and a member of other civic organizations and clubs.

Scissors became a thing of the past for cutting ribbons with the opening of the 1956 Career and Job Show in New York City's 71st Regiment Armory. A solar battery was used to explode the traditional tape at the opening of this new concept in education and employment expositions. Dr. Vladimir K. Zworykin, second from right, honorary vice president, Radio Corporation of America, sets off the "Charge." At far right is an engineer from RCA Research Laboratories, where the electronic ribbon-cutter" was developed.

This Way—

Engineering Careers

• An American Engineer Photo Story •

Cooper Union was one of several colleges and universities at the 1956 Career and Job Show. Men from various engineering departments of Cooper Union spoke to hundreds of young men aiming at engineering careers. Many high school and college guidance counsellors also were at the show to learn firsthand the engineer needs of industry and to pass that information on to their students.

"THIS Way—Engineering Careers" might well have been a slogan raised in lights over New York City's 71st Regiment Armory on March 23 and 24 this year as thousands of young people thronged there to attend the 1956 Career and Job Show sponsored by the Career Training Council of New York.

This AMERICAN ENGINEER Photo Story now takes you on a pictorial tour of the Show, which came as a climax to "New York City Career Training Week" proclaimed officially by Mayor Robert F. Wagner.

In a unique variation of the traditional ribbon-cutting ceremony, the tape that held back the first day's crowds was exploded by an electronic device using a solar battery as a power source.

Welcoming addresses were delivered by Dr. Vladimir K. Zworykin, pioneer scientist in the field of television and honorary vice president of Radio Corporation of America, and by Dr. Edgar G. Shelton, Jr., Director of the National Security Training Commission. The young visitors were then free to tour the exhibits, sponsored by the country's leading industries, guidance groups, colleges, and trade and technical schools, to glean invaluable information about the potential of careers in technology and to see at firsthand some of the fascinating and useful devices that modern science has made possible.

U.S. VETERANS ADMINISTRATION
DIVISION OF VOCATIONAL REHABILITATION

Left: Educational opportunities for veterans—both dis-

Above: A potential engineer? Possibly. This youngster seems to be interested in rocket power, the travel of the future. If he is to be one of the future rocket engineers, now is a good time for him to start learning the facts about engineering. Aerojet General Corporation was just one of many industrial exhibitors at the Show who spoke to hundreds of potential engineers—most of them, of course, a few years older than this young fellow.

Above, right: Dr. Edgar G. Shelton, Jr., Director of the National Security Training Commission, was one of the principal speakers at the opening ceremonies.

Right: Dr. Vladimir K. Zworkin, pioneer of television electronics and honorary vice president of Radio Corporation of America, stressed to an opening-day crowd of present and future engineers that engineering is more than just a job; it is a career which can and does bring to the individual all the joys of accomplishment and personal satisfaction associated with any other career. He said too much emphasis has been placed on the need for engineers and not enough has been said about the "fun" in being an engineer.

The General Motors' "Preview of Progress" show, demonstrating advances in communications, jet propulsion, mechanics, and chemistry, was one of the principal attractions of the exposition. Other features in the spotlight were the Westinghouse Electric Corporation's engineering model of the Nation's first atomic power plant, color television displays by RCA, models of Remington-Rand's famous Univac, and the New York Telephone Company's demonstrations and films on the Nike guided missile.

In addition to providing interested students and their parents with practical samples of the tools and products of the engineering world and affording them a source of down-to-earth advice on the merits of a future in engineering, the Show incorporated a clearing house for jobs for engineers already embarked on their professional careers. The resultant awareness of the available positions in all the engineering fields was also a further spur to the ambitions of the students seriously considering the various branches of technology as their life's work.

The Show's sponsor—the Career Training Council—is a non-profit organization supported by industrial and educational interests. Under the presidency of Irwin A. Shane, former president of the Private Vocational School Association of New York,

FROM WASHINGTON

Left: Educational opportunities for veterans—both disabled and non-disabled—were explained at the Career Show by a team from the New York Regional Office of the Veterans Administration. The VA was just one of many career and educational guidance groups at the show.

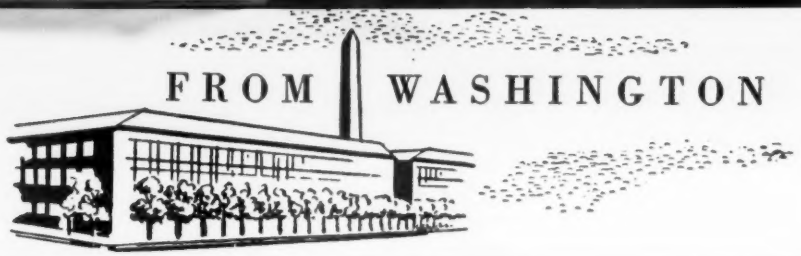
Left, below: Electrical engineer Henri Marcoux, speaking to a group of high school boys interested in learning more about engineering as a career, was one of many professional engineers who helped man the booth of the New York Engineers Committee on Student Guidance.

Below: Engineers of today, tomorrow and the day after tomorrow listen carefully to the facts about nuclear engineering from representatives of Combustion-Engineering. Just this one company was contacted by over 1,000 high school students interested in learning more about engineering careers.

it conducts a year-round program of public education and works to coordinate industry-education efforts to interest students in engineering and scientific careers.

Its advisory board members include Dr. Joseph R. Strobel, Assistant Commissioner of Education for New York State; George A. Kaye, Sr., technical employment manager for Emerson Radio and Phonograph Company; Gordon T. Moore, employment supervisor, Hughes Aircraft Company; George Maedell, president of RCA Institutes Inc.; and Professor William P. Sears of New York University.

The Career and Job Show idea was inaugurated three years ago by Mr. Shane, then in his former position with the Private Vocational School Association. The participation of industry was invited for the first time this year in order to bring the last word in practical vocational guidance to the students who attended. The enthusiasm of both the visitors and the industrial exhibitors has resulted in the scheduling of another Career and Job Show for November at the New York Coliseum, where it is expected that even larger crowds will be on hand to visit the spectacular exhibits that underscore the story of man's technological progress and invite the participation of the younger generation in careers of service through engineering. —***End.***



By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

PRESIDENT AND CONGRESS ACT ON ENGINEERING MANPOWER STUDIES—CAPITOL HILL HEARINGS TO WEIGH SOLUTIONS

THE intense interest and concern in the executive and legislative departments over the engineering and scientific manpower supply picture reached something of a climax in recent weeks with the following major developments:

1. President Eisenhower appointed a National Committee for the Development of Scientists and Engineers, and followed a few days later with the appointment of another group known as the Committee on Education Beyond the High School.
2. The Congressional Joint Committee on Atomic Energy published a comprehensive 85-page report, "Engineering and Scientific Manpower in the United States, Western Europe, and Soviet Russia," by Harris Collingwood of the Library of Congress staff, prefaced with a strong statement by Representative Melvin Price, chairman of the Joint Committee's Research and Development Subcommittee, that Federal action is urgent.
3. Senator Edward J. Thye of Minnesota introduced a proposal to establish a Joint House-Senate Committee on Scientific Research to deal specifically with the problems associated with the training of adequate manpower in the scientific and technological fields.

The President's action followed a study by a special inter-departmental committee which was charged with the development of actions which need to be taken in order to improve the present situation with regard to the education and utilization of highly qualified scientists and engineers.

The special inter-departmental committee, under the chairmanship of the Director of Defense Mobilization, reported to the President that "although the Government has a responsibility for increasing the supply and improving the quality of our technological personnel, the basic responsibility for solution of the problem lies in the concerted action of citizens and citizens' groups organized to act effectively." The group recommended the establishment of the National Committee "comprised of representatives of major citizens' organizations." The chairman of the new group is Dr. Howard L. Bevis, president, Ohio State University, and the vice chairman is Dr. Eric A. Walker, dean of the Pennsylvania State University Engineering and Architectural College. The other representatives (see complete list on page 31) are from organizations in the fields of engineering, science, education, management, labor, state and local governments and the humanities. Staff services for the Committee will be provided by the National Science Foundation, and Robert L. Clark of the ODM staff has been named executive secretary of the group.

Congressman Melvin Price of Illinois

Dr. Howard L. Bevis, President Ohio State University

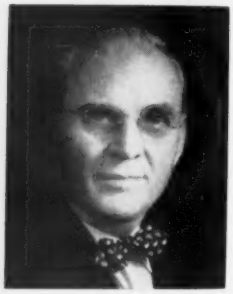
In his letter of appointment to Dr. Bevis, the President said that the country is now "running the danger of losing the position of technological pre-eminence we have long held in the world." He called upon the Committee to assist the Federal Government "in identifying the problems associated with the development of more highly qualified scientists and engineers," and enlist the cooperation of all interested individuals and groups in analyzing the problem and developing programs to deal with it.

The Collingwood report is an excellent reference and statistical document for those interested in the detailed aspects of the manpower supply situation, both for the United States and for other countries. It is available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 25 cents per copy. In his preface, Rep. Price refers to the "gloomy statistics," and then says, "the facts show that we must do something quickly, that we must not simply wring our hands and talk about the dangers." His solution: "I suggest that the Federal Government must take the initiative. Who or what else can? A decisive Federal program can stimulate the cooperation needed from all sectors of our national life."

Price's attitude is in almost direct conflict with the philosophy expressed by President Eisenhower in his statement accompanying the appointment of the National Committee, emphasizing the view that the basic responsibility for solution of the problem should be borne by private citizens.

Specifically, the Illinois solon, who has been critical of the Administration's lack of action on the engineering-scientific manpower problem, proposes the appropriation of Federal funds to expand science departments and engineering schools, and to provide scholarships for high school graduates. He declares in the preface of the report that while there may be controversy over the general question of Federal aid to education, the education of engineers and scientists comes under the constitutional responsibility of Congress to provide for the common defense. "Federal spending is proper to provide enough well-trained engineers and scientists to sustain our security in an age of great scientific 'breakthroughs.' " Price adds that if the young people are given the inducement of scholarships they will turn their attention to preparatory courses they need for professional careers, and high school and college teachers will gain encouragement from the fact that the Government recognizes the importance of their work. He says this will lead to more science teachers "and more students will flock to their classes." The emphasis must be on Federal leadership, he declares, "because nothing else will do. Only the Federal Government has the resources and prestige to produce a swift new emphasis on the training of an adequate number of qualified young people in the engineering and scientific fields."

Price's Subcommittee will hold hearings on this question very soon. NSPE has been requested to testify at the hearings and has accepted the invitation. The NSPE testimony will appear in the next issue of the *American Engineer*.



Senator Edward J. Thye
of Minnesota

Dr. Eric A. Walker, Dean
College of Engineering & Architecture
Pennsylvania State University

On the other side of Capitol Hill, Senator Edward J. Thye of Minnesota has introduced legislation to establish a Joint-House-Senate Committee on Scientific Manpower. The group would be composed of eight House members and eight Senate members. It would not have any legislative authority but would specialize in the study of manpower needs and requirements in the areas of engineering, science, and related subjects. Thye said in offering his resolution that the crux of the problem is that "at the same time that science and technology are moving to a position of unprecedented importance—the manpower to maintain that progress is declining." The Minnesota Senator added that "the legislative branch of Government cannot escape the fact that it is going to become more deeply involved and enmeshed in this vast area of activity. It is incumbent upon the Congress to be fully informed on future developments. . . . In short we will be in part responsible for the success or failure in our country's attempt to advance and expand our leadership in these fields."

Senator Thye feels that the present committees are not equipped to meet this responsibility. He pointed to the Joint Committee on Atomic Energy as a precedent, and said that the Committee on Scientific Research would not conflict with the atomic energy body. The depth of interest on Capitol Hill in the general engineering-scientific manpower problem, and in Senator Thye's proposal, is seen from the fact that already sixteen other Senators—representing all shades of the political spectrum—have attached their names to his bill as co-sponsors.

Interest in Up-the-Ladder Management Started Rheem-Chicago Thinking About a Really Significant Supervisors' Course

How We Developed An Award-Winning Training Program

By F. L. Danicek

Personnel Director, Rheem Manufacturing Company

THE training of supervisors in the Chicago plant of Rheem Manufacturing Company has been developed along the lines basically followed in engineering work. It is engineering because it starts with known factors, and works with them to produce a desired result.

The known factors in this case can be summarized by a simple label: how the plant operates. The desired result is that of having supervisors know their jobs better—particularly in relation to other jobs in the plant, and in relation to the Company's business of manufacturing to make a profit.

Thus, the Rheem-Chicago supervisors' training program was engineered from materials we had: ability of members of the plant operating group to explain their departments to supervisors. To make this operation work, however, previous activities were made to lead into the program for supervisors.

Interest of Rheem-Chicago in "up-the-ladder" management brought about the introduction of a significant course late in 1951. While the plant had long encouraged individual initiative in training—by such means as helping promotable men take evening courses in engineering, mathematics, economics, etc.—this new course set a new pace for group training. Dr. Homer Gammel of the University of Illinois was enlisted to give a series of training sessions. The subject was supervisory development and human relations; and the approach was a sincere, shirt-sleeves brand of psychology that would be actually useful to supervisors.

All the supervisors were included in the course. In a separate series of meetings, however, the plant operating group took the same course. This plan of running the course in duplicate made it possible, of course, for the operating group to be definitely aware of change in the point of view of supervisors, that was brought about by the course.

Training in such a general subject as supervisory development and human relations—as valuable as it was shown to be—is not actually considered as a basic part of supervisory training at Rheem-Chicago. Instead, it is considered as valuable background that developed interest needed in supervisory personnel to make the subsequent training course effective.

F. L. Danicek, left, personnel director of the Chicago plant of Rheem Manufacturing Company, accepts the Award of Merit from A. Harrison Saunders, representing the Research Institute of America. The Award, the second successive annual citation to be given Danicek by the Institute, was made in recognition of a program developed and operated by Danicek for the training of supervisory personnel.

PREPARATION of this kind can be expensive without good follow-through. With definite objectives, however, management considered it very much worthwhile to make expenditures to guarantee effectiveness of the training program. In fact, one such expenditure was made in that the personnel director took an intensive 3-day course in conference leadership as one of the final preparations for the training program for supervisors.

The plan of the program had the advantage of simplicity for the operating group. Each department head merely had the responsibility for telling the class of supervisors what his department does, why it exists in relation to the total operation of the plant, and the methods used in operation.

The start of the training program, however, was hardly a new experience to members of the operating group. The emphasis of Rheem on safety in all plants had given Rheem-Chicago some convincing lessons on how to teach important subjects to people.

Working on the approach of merchandising safety—rather than enforcing it—had given the operating group a major challenge. It had already become a standard part of the duty of each member of the operating group to appear at safety meetings, held weekly by each manufacturing department in the plant. In the training program, however, the plan called for each operating head to carry a specific responsibility to teach the principle of operation of his department to the supervisory force.

To help members of the operating group—particularly those who could do their jobs better than they could talk

F. L. Danicek and R. E. Lense hold an important new volume—a complete manual for supervisors—one of the visible results at the end of the first 13-week supervisory training program at the Chicago plant of Rheem Manufacturing Company.

about them—the personnel director opened the series and conducted the first three sessions. This approach made it possible for the operating group to observe and study presentation techniques.

Following each of these first three sessions, the personnel manager conducted meetings of the operating group to discuss conference leadership. In this manner, each man who was to conduct a class session had the opportunity to better outline his material, to visualize his presentation and to develop enthusiasm for material to be presented.

Subjects covered, in the part of the program handled by the personnel department, included training new employees, remuneration and incentives, health and sanitation, safety, financial aids to employees, employee service activities, and the results accomplished by the various reports used in the plant.

Subsequent to this section of the training program, the following subjects were covered, each in one or more meetings of the class:

Reports, Expenditures & Contracts
Quality Control
Traffic & Shipping
Purchasing
Accounting
Industrial Engineering
Engineering & Maintenance

In each case, the sessions of the school were down-to-earth, in that they dealt with work that was actually being done and had a specific relationship to manufacturing. This approach eliminated theory and obscure ideas. Visual aids were used throughout the course. Instead of using "canned" material, however, each session of the training program used the actual tools of work.

INDUSTRIAL engineering for example, made extensive use of such items as blue prints, slide rules, stop watches, and other materials that supervisors would see in use by industrial engineers at work in the plant.

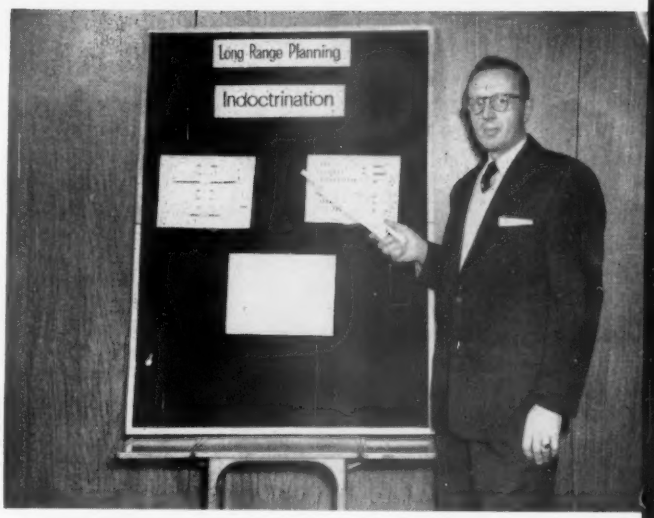
All through the presentation these tools of industrial engineers were used to illustrate how this function of the plant operated in relation to the jobs of supervisors.

Early in the classes on industrial engineering, operation analysis was introduced as an example. Here, it was emphasized that regardless of who analyzed an operation —supervisor or engineer—the analysis was needed. Also, it was stressed that engineers were employed for this job to provide one of the basic services for supervisors. While it was recognized that most supervisors could probably do very well in much operation analysis, it was made clear to the class that a supervisor's first responsibility is day-to-day leadership of his group.

This concept of industrial engineering was further illustrated by discussion on just what constitutes an operation anlysis. During these classes subsidiary points were filled in and discussed under the following headings:

Purpose of operation
Survey of operation performed
Inspection requirements
Material
Material handling
Setup
Tool equipment
Working conditions
Other conditions

F. L. Danicek, personnel director of the Chicago plant of Rheem Manufacturing Company, makes a presentation on safety, one of the program's proved presentation techniques for the Company's engineered approach to supervisory training.



Company engineer R. E. Lense reviews some of the "tools of industrial engineering" in the discussion period at the end of one of the class meetings of the supervisory training program at Rheem-Chicago.

THE first component in the job of operation analysis, discussed by the class was motion study. As the instructor outlined the objectives toward which the industrial engineers worked in motion study, the illustrations touched the actual recent experiences of the supervisors. This recall process brought supervisors into the discussion actively and gave them a new, strong interest in the aims and methods of this aspect of industrial engineering.

Thus, after making the subject of motion study an obviously common experience to all the supervisors, the next step was a discussion on how to organize the material for use.

It was shown that, in taking the several parts of an operation for individual observation, the engineering process became an actual study to yield specific results. In this manner the "quick guess" of a supervisor was discouraged, in favor of the orderly approach. And it was illustrated that the thoroughness of industrial engineering was a much needed help for supervisors.

Methods of recording the various parts of motion study were shown and discussed. In this discussion, the supervisors found much of the "mystery" of industrial engineering disappearing, as an understanding of aims and methods was developed.

Perhaps there was no result more convincing in the entire training course than the understanding of how motion studies led to the development of fair and realistic standards and incentives. Equipped with this understanding, the supervisors were more able—and more confident—than ever before to meet any problems on rates.

This ability and confidence, in a general way, at least, are typical of the knowledge supervisors gained in the training course. For in all aspects of plant operation the growth in understanding by the supervisors gave them a new outlook on their jobs and new sense of leadership.

To cover the functions of the Rheem-Chicago plant required a course of 13 weeks. The classes were held from 4 to 6, once a week. In selecting this time, it was possible to work in the supervisory personnel of both the day and night shifts. Approximately 50 people took the entire 13-week course which began in February of 1953.

IN each meeting of the class records were made of the entire proceedings. The next day the record was transcribed, edited and abstracted to make the material more practical as a written guide.

These abstracted versions of the training program were gathered in a binder at the conclusion of the course and distributed to all of the members of the class as well as to the plant operating executives who were also present throughout the duration of the course. The result of this effort was a supervisory manual which has become a standard part of equipment used by all supervisors of the Rheem-Chicago plant. As men progress to the rank of supervisor, they are given copies of the manual by immediate superiors with some discussion on the importance of knowing how the plant operates in order to do a sound supervisory job.

Methods and channels for revising material frequently are established in this Rheem program. All holders of supervisory manuals are registered in the personnel department and any revision in procedure, organization, etc. is covered in supplements to the supervisory manual or in replacements for this and other sections. A covering letter is used to transmit the manual in each case. In the event of an extensive change, meetings are held to clarify the changes when the revised material is ready for distribution.

This supervisors' program is perhaps as simple and free of mystery as any training that has been done for supervisory people. At Rheem-Chicago it is visualized, however, as being only a start in the ultimate objectives in supervisory training. In using this course, it is a particular aim to try to strengthen weaknesses of any supervisory personnel and to enhance their effectiveness in the organization.

Toward this objective, it is encouraging for this training program to have been recognized with an Award of Merit by the Research Institute of America. In having been thus cited for a "contribution to executive skills," the management of Rheem-Chicago is gratified to have this independent judgment that it is "on target" in supervisory training.—***End.***

About the Author . . .

Mr. Danicek

Frank L. Danicek, personnel director of the Rheem Manufacturing Company's Chicago plant, has established a record in the Chicago area as an expert in personnel and industrial relations work. He attended the Lewis Institute, now a division of the Illinois Institute of Technology, in Chicago. He has done production control, time study, and service correspondence work prior to his entering the personnel field.

Mr. Danicek has been the recipient of two successive annual awards from the Research Institute of America—one for a successful in-plant training program with a unique approach to safety, and the second for the supervisory training program described in this article.

He is a member of the boards of directors of the Chicago chapters of both the Society for the Advancement of Management and the Personnel Management Association and chairman of the Executive Committee of the Chicago Chapter of the Industry Management Club. He also belongs to the American Management Association.

During World War II, he served in the Counseling Branch at one of the Army's separation centers.

Mr. Danicek resides in Homewood, Illinois.

At the Annual Meeting . . .

Panels to Discuss P.E.s in Education, Gov't., Consulting, Industry

MEMBERS of the National Society of Professional Engineers are looking forward to one of the most profitable and informative professional gatherings in the Society's history as they prepare to attend the 1956 annual meeting, which will be held in Atlantic City, New Jersey, from May 24 through May 26.

Headquartered at the Ambassador Hotel, the meeting proper will be preceded by a day-long Executive Committee conference on the 23rd and also a special session of the NSPE Board of Directors on the evening of the same day. These two group sessions will take care of much of the necessary preliminary administrative detail work so that maximum attention can be centered on the professional aspects of the meeting when it is officially called to order on the 24th by NSPE President Allison C. Neff.

Inquiries from the press, Government agencies, universities, and industry indicate that an exceptional amount of outside interest has been aroused in the four special professional conferences planned to deal with the concerns of engineers in industry, government, private practice, and education. It is expected that, in addition to the NSPE members, a number of observers from outside the Society will be attending the conferences in which they are particularly interested. Nationally-known engineers will take part in each of these seminars.

A highlight of the meeting will be the installation of NSPE's officers for the 1956-57 term. They are Robert J. Rhinehart, president; Allan H. Kidder, Warner Howe, Clark A. Dunn, Lindley R. Durkee, Garvin H. Dyer, and Harry G. Kennedy, vice presidents; and Russell B. Allen, treasurer. Their terms of office, however, will not begin officially until July 1.

Also awaited with interest is the announcement of the name of the recipient of the NSPE Award for 1956. The engineer selected by the Awards Committee for this honor will deliver a major address at the closing banquet on May 26.

The meeting is being held in conjunction with the annual convention of the New Jersey Society of Professional Engineers. A schedule of special activities for the NJSPE membership is also planned.

There will be both formal and informal social events on the program, and a series of parties and tours is being arranged for the ladies who will attend.

The complete program for the meeting follows:

Here Is the Topnotch Program for Atlantic City

Wednesday, May 23, 1956

7:00 p.m. — Dinner for Board, to be followed by a Meeting of Board of Directors

Thursday, May 24, 1956

9:00 a.m. — Registration (Booth will be open all day)

9:00 a.m.—10:30 a.m. — Professional Meeting
- Public Relations Group—Vice President Lindley R. Durkee, Presiding
- National Affairs
- National Defense
- Public Relations

10:30 a.m.—11:30 a.m. — Visit the Exhibits

11:30 a.m.—12:30 p.m. — Professional Meeting (continued)

12:30 p.m.— 2:00 p.m. — Regional Luncheons
- Northeastern Region: Vice President Louis F. Frazza, Presiding
- Southeastern Region: Vice President Warner Howe, Presiding
- Central Region: Vice President Virgil E. Gunlock, Presiding
- North Central Region: Vice President Garvin H. Dyer, Presiding
- Southwestern Region: Vice President Robert J. Rhinehart, Presiding
- Western Region: Vice President Lindley R. Durkee, Presiding

2:00 p.m.— 3:00 p.m. — Visit the Exhibits

3:00 p.m.— 5:00 p.m. — Professional Meeting
- Interprofessional Relations Group—Vice President Louis F. Frazza, Presiding
- Interprofessional Relations
- Inter-Society Relations
- Liaison with EJC
- ECPD-NSPE Relations
- Activities Group—Vice President Warner Howe, Presiding
- Chapter Activities
- Publications
- Membership

3:00 p.m.— 5:00 p.m. — Visit the Exhibits

8:00 p.m. — Informal Get-together

Friday, May 25, 1956

9:00 a.m. — Registration (Booth will be open all day)

9:00 a.m.—10:00 a.m. — Visit the Exhibits

10:00 a.m.—11:30 a.m. — Three simultaneous conferences will be conducted. (See detailed program, page 23.) Discussion will deal with the following groups:

For Fun and Profit, Come [illegible]

Send in This Reservation Coupe[illegible]ow:

Engineers in Industry
Engineers in Government
Consulting Engineers
(These programs to be under the direction of the Chairmen of the NSPE Committees concerned)
A fourth conference dealing with Engineers in Education will convene at 3:00 p.m.

10:00 a.m.—11:30 a.m. Visit the Exhibits
11:30 a.m.—12:30 p.m. Visit the Exhibits
12:30 p.m.— 2:00 p.m. Luncheon
Speaker: Maynard M. Boring, president, American Society for Engineering Education
2:00 p.m.— 3:00 p.m. Visit the Exhibits
3:00 p.m.— 5:00 p.m. Continuation of the conferences dealing with:
Engineers in Industry
Engineers in Government
Consulting Engineers
Conference dealing with:
Engineers in Education
3:00 p.m.— 5:00 p.m. Visit the Exhibits
6:00 p.m.— 7:00 p.m. Cocktail Party
7:00 p.m. Mr. and Mrs. "Smoker" and Annual Awards Dinner sponsored by NJSPE—Engineer and Citizen-of-the-Year Awards

Saturday, May 26, 1956

8:30 a.m.—10: a.m. Professional Meeting—Vice President Robert J. Rhinehart, Presiding
Education and Professional Development Group
Education
Registration
Young Engineers
9:00 a.m.—12:00 noon Registration
9:00 a.m.—12:00 noon Visit the Exhibits
10:00 a.m.—12:00 noon NJSPE Annual Meeting
11:00 a.m.—12:00 noon Professional Meeting—Vice President Garvin H. Dyer, Presiding
Professional Practice Group
Employment Practices
Engineering Practices
Ethical Practices
12:30 p.m.— 2:00 p.m. Awards Luncheon
Speaker: G. Donald Kennedy, president, Portland Cement Association
2:00 p.m.— 4:00 p.m. Professional Meeting
Operating and Services Group—Vice President Virgil E. Gunlock, Presiding
Constitution and Bylaws
Budget
Legislation
Resolutions
2:00 p.m.— 5:00 p.m. Visit the Exhibits
4:00 p.m.— 5:00 p.m. Annual Meeting NSPE
6:00 p.m.— 7:00 p.m. NJSPE Cocktail Party
7:00 p.m.—Midnight Banquet—National Awards, Transfer of Officers and Formal Dinner Dance

SPEAKERS FOR PANELS AT ATLANTIC CITY

EDUCATION—TEACHING PROFESSIONAL CONCEPTS

Glenn W. Ernsberger, President, Ohio SPE Student Council
Student, Ohio Northern U.
Ada, Ohio

J. W. Whittemore, P.E.
Dean of Engineering & Architecture
Virginia Polytechnic Institute
Blacksburg, Va.

Robert B. Rice, P.E.
Head, Department of Diesel & I. C. Engines
University of North Carolina
Raleigh, N. C.
Chairman, NSPE Education Committee

Leland S. Hobson, P.E.
Professor, Assoc. Director
Engineering Experiment Station
Kansas State College
Manhattan, Kansas

PROFESSIONAL STATUS OF ENGINEERS IN GOVERNMENT

Federal

Charles D. Curran, P.E.
Former Staff Director
Hoover Commission
Washington, D. C.

State

Arthur L. Wiesenberg, P.E.
Deputy Secy. and Chief Engineer
Penn. Dept. of Highways
Harrisburg, Penn.

Municipal and County

Frank G. Manning, P.E.
Chief Engineer
Department of Public Works
Jersey City, N. J.

MANAGEMENT-PROFESSIONAL EMPLOYEE RELATIONS

H. P. Cooper, P.E.
The Dow Chemical Company
Freeport, Texas
Subject: Desirable Attitudes and Actions of Employed Professional Engineers (The Employee Viewpoint)

Wendel Burton, P.E.
Employment Manager
Minnesota Mining and Manufacturing Company
St. Paul, Minnesota
(Chairman, Relations with Industry Division, American Society for Engineering Education)
Subject: Desirable Attitudes and Actions of Employed Professional Engineers (The Management Viewpoint)

G. W. McCullough, P.E.
Vice President
Phillips Petroleum Company
Bartlesville, Okla.
Subject: Desirable Management Policies for Professional Engineers (The Management Viewpoint)

E. E. George, P.E.
Ebasco Services
Little Rock, Ark.
Subject: Desirable Management Policies for Professional Engineers (The Employee Viewpoint)

CONSULTING

John B. McGaughy, P.E., (Presiding)
Consulting Engineer, Norfolk, Va.
Chairman, NSPE Engineering Practices Committee

t Atlantic City

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May, 1956

Reservation Rate Memo

The Ambassador
ATLANTIC CITY

PLEASE MAKE MY RESERVATIONS AS CHECKED BELOW:

22nd NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
32nd NEW JERSEY SOCIETY OF PROFESSIONAL ENGINEERS
CONVENTION AND EXHIBITION • MAY 24, 25, 26, 1956

Please reserve.....room(s) at the rate of $.....per day, and acknowledge to:

Name .....

Address .....City .....State .....

EUROPEAN PLAN—DAILY RATES—ROOMS WITH TWIN BEDS & PRIVATE BATHS

Single, 1 person	☐ $ 6.	☐ $ 8.	☐ $10.	☐ $12.	☐ $14.	
Double, 2 persons	☐ $ 8.	☐ $10.	☐ $12.	☐ $14.	☐ $16.	☐ $18.
Parlor—1 Double with Bath		☐ $20.	☐ $28.	☐ $36.		
Combinations—2 Doubles—1 Bath			☐ $16.	☐ $20.	☐ $28.	

Date of Arrival.....Date of Departure.....

ALL RESERVATIONS WILL BE ACKNOWLEDGED

Engineering Employment Practices

Digest

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ **The District Court of the U. S. for the District of Columbia has been asked to overrule a holding of the National Labor Relations Board that professional employees represented by a heterogeneous union are not entitled to a separate vote in a decertification proceeding. NSPE had protested to the Board against its new policy. The court action was filed by engineers of Westinghouse at its Jersey City plant who are now represented for collective bargaining by the electrical workers union. The NLRB has denied them a separate professional group vote to decide if they want to continue that representation. The complaint alleges that decision of the NLRB is contrary to the professional provisions of the Taft-Hartley Act.**

✓ The Mueller Brass Co., Port Huron, Mich., has issued a policy statement urging its engineering employees to secure registration. The company objective is to have all its engineers registered. Engineers being considered for employment will have to indicate an intent to secure registration as soon as qualified. Strong preference will be given to registered engineers in considering promotions to supervisory engineering positions. The policy statement was worked out by the company with the cooperation of the Michigan SPE.

✓ *An Individual Professional Development Program has been established by the Marquardt Aircraft Company, Van Nuys, Calif. The program features supplemental technical training and education designed to attain the professional goal established by the individual engineers.*

✓ **Arthur S. Flemming, Director, Office of Defense Mobilization, said at a recent meeting that it is necessary for industry to do a better job in utilizing its engineers and scientists. The ODM head deplored the practice of moving an outstanding technical person into an administrative position "solely for the purpose of providing him with additional compensation." He said when this is done "we are failing to utilize such a person in the most effective possible manner solely because we are unwilling to face and to solve the human relations problems involved in paying the scientist the same or even a higher salary than the administrator."**

✓ On the economic front: A salary survey by the Dominican Council of Professional Engineers (Canada) shows median income by year of graduation as: 1955, $4200; 1954, $4400; 1953, $4600; 1952, $5000; 1951, $5300 . . . the University of Dayton reports engineering starting salaries up to $485 per month . . . some of the larger oil companies are offering draft-eligible engineering graduates up to $440 monthly . . . a survey of 168 industrial concerns by Northwestern University reports average starting salaries for engineers at $371 at the close of 1955, and an anticipated average of $394 for 1956 . . . John E. Gagnon, director of personnel, Oil Mathieson Chemical Corp., says that high starting salaries may mean trouble later on, pointing to the expense of turnover among engineers when the more experienced men leave because of the relatively small differential between their salaries and the newly-hired.

✓ *The National Industrial Conference Board reports on a survey of sixteen engineering union contracts with reference to seniority clauses. The survey shows that the engineering unions do include seniority provisions of special types. The seniority provisions, which govern priority in layoff, weigh education, skills, experience and performance, in addition to length of service. Two of the reported versions of seniority clauses give the companies the right to select key engineering personnel who remain outside of the seniority requirements.*

A Working Tool . . .

A Study in Position Classification For Use By Professional Engineers

By John Bamberg

Position Classifier for the United States Government

CLASSIFICATION of positions for pay, recruitment, and promotion purposes is simple in principle even though sometimes it becomes difficult in application. It is basically a matter of arranging positions into an orderly sequence of progressive values.

Many of the difficulties of application derive from attempts to use a classification system broad enough to include all kinds of positions. Other difficulties derive from attempts to substitute objective or quantitative measurements for informed subjective or qualitative judgments. Both attempts tend to take the classification process out of the hands of the people whose jobs are being classified, and put it into the hands of "position classifiers."

Here is a classification plan limited to professional engineering positions, and frankly based upon subjective definitions of grades. It is intended for use by engineers themselves. *(See pages 26 and 27).*

The plan is built on the same number of grades for professional positions as is used in the Federal classification system; and the grade definitions conform to that plan. Therefore, engineers in Federal service can use it by changing Grade 1 to GS-5, Grades 2, 3, and 4 to GS-7, 9, and 11, Grade 5 to GS-12, and so on up the scale.

The Chart is a schematic outline, and like any other abbreviation it cannot cover all conditions. It serves chiefly to establish "control points." The text is supplemental and can be read parallel with the Chart; but a first quick reading will be helpful. Once mastered, however, it can be put aside and the Chart used alone as a working tool in grading individual positions.

Definition and Use of Grade 1—Trainee Engineer

Grade 1 is essentially a trainee grade, or recruitment grade for engineers with an engineering degree but no work experience.

The first assignments performed by such trainees may not be very different from work done by sub-professional aides, computers, and draftsmen. But, where the sub-professionals work with knowledge learned on the job and will need instruction on new assignments, the Trainee Engineers work with knowledge of theory and principles that permit analysis of new problems. The sub-professionals are working for production; the trainees, although producing also, are working chiefly to gain job knowledge and to increase their professional usefulness.

Definition and Use of Grade 2—Assistant Engineer

Grade 2 applies to engineers who have learned to apply their professional training to the actual work situations to which they are assigned, and who have learned enough about that work that they know when results are valid or when they need help on a problem, and to carry an assigned job through to completion.

Assignment to engineers at this grade consists of work in direct support of higher graded engineers; work which those engineers would do themselves if any one of them were on a job alone, but which with help available they segregate into jobs for these Assistant Engineers.

Such assignments are a continuation of the engineers' job-learning if they cover a variety of work. If they do not, the engineers may become little better than high grade aides, and the young engineer will either quit of boredom (when job opportunities are plentiful) or cease to grow professionally. But if the organization is large or expanding he may reasonably expect to advance to Grade 3 after about a year of service in Grade 2. Or in a more stable program he may still expect to advance if he qualifies, and if his supervisor determines that it is in the interest of the organization to make greater use of his ability as discussed later under Grade 3.

Definition and Use of Grade 3—Associate Engineer

Grade 3 engineers are also assigned to segregated supporting work. The assignments at this grade will differ from those at Grade 2 chiefly in *degree* of difficulty rather than in any easily defined differences in the kind of work performed.

This difference in degree is partially expressed in the terms "assistant" and "associate." The idea of assistant was defined above. The idea of "associate" has come by long usage to apply to an employee who is nearly the peer of his superior; one who can do the same things which his superior does, and who differs from him principally in that the superior furnishes the leadership—the ideas, the creative direction, the organization of joint effort—which turns the work of the associates into accomplished objectives.

The difference is more specifically expressed in the circumstances of the work assignments. Whereas at Grade 2 the assignments consisted of tasks laid out separately by the supervisor and later related by him to the basic job, at Grade 3 the assignment consists of continuing work in which the separate tasks are carried through to completion and used in the total assignment by the Associate himself. The supervision at Grade 3 is lessened, consisting chiefly of initial instructions defining the scope of the assignment and job elements new to the Associate.

Detailed review of the work becomes impractical since the separate phases of that work will have been combined into an interpreted result; therefore, it is limited to an evaluation of conclusions rather than of the work which led to these conclusions. This in turn increases the degree of responsibility for the results. Inadequate performance, inaccurate application of principles, errors in judgment—all these may be covered over by subsequent work so that they are not readily detected and may adversely affect later use of the work.

Performance of such continuing assignments under these conditions of supervision and responsibility will demand measureably higher job knowledge—understanding of the purpose of the work and of the total purpose to which it is directed.

Grade 3 will require increased personal qualifications also. It will require qualities of proven dependability, accuracy of work, soundness of judgment, perception of problems, and ability to carry an assignment through to successful completion with a minimum of demands upon the supervisor's time. These qualifications must be present before a supervisor can safely delegate the responsibility which goes with the Grade 3.

As these differences of degrees become greater through increased knowledge and experience, these Associate jobs may begin to closely resemble the "full professional" level of assignments defined later as Grade 4. But the distinction remains in the basic definition that Grade 3 assignments consist chiefly of segregated supporting work which has little significance of itself until it is incorporated into a larger function—until it is used by the superior who initially formulated the assignments.

Use of Grades 2 and 3 in Personnel Utilization

The similarities between the Assistant and Associate levels have a management aspect which is significant in the practical application of classification to operational planning. Grades 2 and 3 can be used with some flexibility by the operating supervisor in planning his organization and operations and in utilizing the available personnel skills.

He may, for economy or because of inability to recruit skilled workers, concentrate all his responsible work into a few supervisory and review jobs and reduce the other jobs to low grade production work. Or he may reduce the supervision and review, and distribute the work among all the employees so that each one has some responsible and difficult work along with the supporting tasks. The first plan may save salary cost, but may destroy promotional opportunities and make the jobs too dull to hold employees. The second may increase salary cost or, if carried too far, may dilute all the jobs so that none are interesting, or may make it hard to fix responsibility; but it may build a reserve of skill to meet possible work load increases. Or the supervisor may maintain a fluid balance between these two extremes—a balance based upon the most efficient use of his individual staff members in relationship to all the factors of operational planning such as costs, production schedules, changing work loads, and a reasonable reserve of skill for expansions.

To this extent, classification of positions is more adaptable to management considerations than is generally recognized or acknowledged.

Other Types of Grade 3 Positions

Some Grade 3 assignments do not fit this Associate definition, but still fit the definition of segregated supporting work. These assignments are illustrated by such jobs as surveyors in cartographic or civil engineering, or inspectors in specific fields on construction work, or hydrographers in resource investigations. Independent working positions in such lines of work may sometimes appear

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OUTLINE DEFINITION OF GRADE LEVELS FOR PROFESSIONAL ENGINEER POSITIONS

GRADE 8—TOP EXECUTIVE POSITIONS

Applicable to corporation or organizational heads, program planning, and policy advisory positions,
- allocated by the Boards of Directors on comparative analysis of program responsibility; and
- evaluation of personal worth.

EXECUTIVE

GRADE 7—EXECUTIVE ENGINEER

Supervisory and staff work, requiring
- knowledge and experience in the professional field which predominates in the program of the organization; but also
- executive qualifications sufficient to provide supervisory program control over other fields concurrently.

Work assignments at the level of
- (1) chief staff officers for a functional area at a departmental office;
- (2) heads of an agency or office with a single-mission program, or offices in charge of a geographic or separate functional area; or
- (3) heads of a major division of an office or agency with a multiple-purpose program.

Under supervision which is essentially limited to
- definition of policy and mission of the office or agency.

With the employee responsible for
- fulfillment of the mission.

SUPERVISORS OF WORKING ORGANIZATIONS OR SPECIALISTS

GRADE 6—PRINCIPAL ENGINEER

Supervisory, staff and specialist work, requiring
- knowledge and experience similar to Grade 5, and differing chiefly in degree.

Work assignments consisting of
- (1) supervisory direction of organizations, involving
  - related work outside the principal occupational field,
  - indirect control through intermediate supervisors at Grade 4 and Grade 5 levels, and
  - administrative or managerial planning of organization, staff, program scheduling, and work coordination; or
- (2) staff assignments at policy advisor levels of organization; or
- (3) specialist work involving research into new or undeveloped areas within the professional field.

Under supervision which is essentially limited to
- definition of program, policies, and authority.

With the employee responsible for
- program formulation and accomplishment, and
- policy conformance.

GRADE 5—SENIOR ENGINEER

- (1) Supervisory work, or
- (2) staff level assignments, or
- (3) specialist work, all requiring
  - (1) knowledge and experience in the full range of the professional field sufficient to provide
    - technical leadership in the field, and
    - program accomplishment (as distinct from operational performance); or
  - (2) knowledge and experience beyond the normal professional demands and sufficient to provide
    - solutions to technical problems which exceed the resource of the "field" or operating offices, and
    - development of technical assistance to field offices; or
  - (3) specialized knowledge beyond the normal professional demands and sufficient to research into application of new methods and new knowledge.

Work assignments consisting of
- (1) supervisory direction of operations, requiring
  - organization of work force,
  - technical leadership over several related operational or functional groups performing work of Grade 4 level, and
  - consolidation of this work into program execution; or
- (2) staff positions requiring
  - development of program objectives, methods, and performance standards, and
  - rendering of technical assistance; or
- (3) specialist positions requiring
  - research into new applications of knowledge
  - developments of methods, or
  - resolution of problem assignments.

Under supervision which is essentially limited to
- administrative controls.

With the employee responsible for
- program accomplishment.

FULL PROFESSIONAL PERFORMANCE LEVEL

GRADE 4—FULL PROFESSIONAL LEVEL

Benchmark work level requiring
- knowledge of the full range of principles underlying the professional field, and
- experience in applying these principles, sufficient to provide for fulfillment of the responsibility for assigned operational functions on portions of a continuing program (as distinct from

to be full professional assignments in an occupational field of their own, and hence fit the Grade 4 definition discussed below. But these assignments are still segregated supporting work in the sense that they are parts of larger assignments; they are means to another end. The surveys are only a means toward land mapping or toward location and control of construction work; the inspections are controls for the construction engineering; the hydrographers are collecting and processing information to be interpreted by others.

Such assignments still fit the definition of segregated supporting work, also, in that the basic training and knowledge used on them are part of the educational qualifications for the broader fields, and the experience gained on them can be qualifying for advancement to other work in those fields.

However, such assignments may become permanent careers for employees who have acquired the knowledge and skills required for this work through practical experience and self-study; but who do not have the educational background required for the broader field. Or there may be those who, despite their academic training, still lack the personal qualifications of leadership, creativeness, and imagination essential for advancement. Such employees may advance a little further as supervisors over production work in these segregated activities; but generally speaking they will remain at about the Grade 3 level.

Cautions

In using these grade criteria, a clear distinction must be drawn between *segregation* of work as described here, and *specialization* as used later in Grades 5 and 6. Segregation is used to designate a subordinate part of the basic work in an engineering field, the performance of which requires no more, and usually less than, the knowledge required for the whole field. Specialization may also deal with only part of the field; but is premised upon an initial knowledge of the whole field plus additional knowledge gained by advanced study and intensive experience in particular problems.

Promotion to Grade 4 represents a major career advancement from segregated supporting work to assumption of responsibility for an assigned portion of a program. Such program assignments may be sharply limited by the work mission of an organization; therefore, there may be many positions at Grade 3 and below but few at Grade 4 and above. Individual employees may become fully qualified for promotion by knowledge and experience and length of service, but still not be advanced because of this lack of program positions.

Definition and Use of Grade 4—Engineer

Grade 4, as the full professional rank of engineer, is a major benchmark in the grading scale. It is the grade for assignments covering the full range of an occupational field—assignments which, when the volume of work is more than one engineer can handle, can be broken down into segregated supporting tasks and parceled out to associates and assistants at Grades 3 and 2.

Or stated differently, Grade 4 applies to assignments at levels of skill, knowledge and experience which would be required of an employee on a job which was small enough that he, as the sole employee in his field, could do all the work required, but diversified enough to involve activities across the full range of his basic training. For example, a single mechanical engineer in a plant would furnish all the engineering inspection and instructions needed by mechanics in the maintenance and modification of machinery; he would design and prepare specifications for new equipment, perform plant layout, and provide similar engineering services.

(*Continued on page 48*)

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performance of assigned work within a function or program).
Work assignments consisting of
responsibility for accomplishments of a functional operation or continuing work program involving
multiple phases of work or activities running both concurrently and consecutively, and requiring
organization of work,
relating the separate work results to the objectives of the assignments, and
appraisal as to when the responsibility has been adequately and completely fulfilled.
Under supervision which
defines the responsibilities to be fulfilled,
defines the extent of delegated authorities,
establishes channels of assistance and controls, and
reviews work chiefly in terms of results obtained, and
normally provides technical leadership or resource in the same professional field.
With the employee responsible for
technical competence of the results, and
fulfillment of the assigned responsibility.

SEGREGATED AND SUPPORTING WORK WITHIN AN OCCUPATIONAL FIELD REQUIRING COLLEGE DEGREE OR EQUIVALENT TRAINING

GRADE 3—ASSOCIATE ENGINEER

Supporting work requiring
professional training, plus
(1) mastery of a particular phase of work, or
(2) experience in all major phases of the work, sufficient to provide for
continued work on own initiative without technical direction; and
completion of assignment in form and quality which demands no review of performance.
Work assignments consisting of
(1) continued performance of distinctly segregated phases of work in professional field, or
(2) performance of separately defined assignments to a variety of problems throughout the field, in either case requiring
understanding of the objectives to be reached,
selection of methods,
application of principles, and
completion of work to a point where it needs no further processing before being incorporated with other work.
Under supervision which
defines assignments only in terms of objectives,
furnishes instructions chiefly of an administrative nature, and
reviews work chiefly for accomplishment of the total assignment.
With the employee responsible for
technical competence of the results, and
completion of work as scheduled.

GRADE 2—ASSISTANT ENGINEER

Supporting work requiring
professional training, plus
work experience in the specific work of the organization (or similar work elsewhere) sufficient to provide for
self-directed work without continuing instructions, and
ability to carry assignments through to completion.
Work assignments consisting of
tasks for which the general methods have been defined (either initially for continuing assignments or separately for specific assignments), but
requiring that the employee understand the principles involved and the results desired sufficiently to appraise results during work progress and seek help when needed.
Under supervision which
defines assignments in terms of work to be done,
furnishes instructions on phases of the work which require unusual handling, or which exceed the employee's previous experience, and
reviews the completed work for conformance to expected results or established criteria.
With the employee responsible for
conformance to instructions and accuracy of details,
completion of work in form for use without detailed review, and
meeting of production schedules.

GRADE 1—TRAINEE ENGINEER

Entrance rating, requiring
academic training, equal to a four year college course in a specialized engineering field, or
on-the-job training and related study equivalent to such academic training; and in each case
capacity to advance in that field.
Work assignments consisting of
tasks selected for furnishing job training specific to the mission of the organization, but
tasks requiring application of principles to problems.
Under supervision which
assigns each task and furnishes specific instructions according to the nature of the work and the experience of the employee,
furnishes continuing assistance as needed, and
reviews work for accuracy of performance and results.
With the employee responsible only for
proper application of his training and experience, and
production of defined work on each assignment.

Dunn Honored . . .

Dr. Clark A. Dunn, right, an incoming vice president of the NSPE, was surprised recently with an engraved plaque from members of the Payne County Chapter of the Oklahoma Society of Professional Engineers for his outstanding service to the engineering profession. Presentation was made by Professor L. F. Sheerar, left, president of the Chapter, at a dinner meeting in the Student Union of the Oklahoma A. & M. College. Vice president-elect of the Southwest Region of the National Society of Professional Engineers, Dr. Dunn is executive director of Engineering Research at the Oklahoma A. & M. College.

Tau Beta Pi Names 1956-57 Fellows

Announcement has been made by Tau Beta Pi, the national engineering honor society, of the selection of five young engineers for graduate fellowship awards in the 1956-57 academic year.

The young men, the fields in which they will study, and the schools which they will attend under the award grants are as follows: A. Anton Fredrickson, Jr., of Phoenix, Arizona—electrical engineering, Stanford University; Jury Lewizky, Detroit, Michigan — aeronautical engineering, Wayne University; Richard B. Ulp, Northumberland, Pennsylvania—civil engineering, University of Illinois or Cornell University; Steven J. Fenves, Urbana, Illinois—civil engineering, University of Illinois; and Dieu H. Khuong, South Viet Nam—mechanical engineering, Massachusetts Institute of Technology.

The fellowships awarded Mr. Fredrickson and Mr. Lewisky are those sponsored respectively by the Louis Allis Company of Milwaukee and the Minneapolis-Honeywell Regulator Company of Minneapolis.

Mr. Ulp is the recipient of the Charles H. Spencer Fellowship which is being given for the first time this year. Mr. Spencer, who lives in Washington, D. C., is the former chief engineer of the Interstate Commerce Commission and was Tau Beta Pi's national president from 1936 to 1947.

N.Y. *Times* Prints NSPE Letter On Education

The National Society's interest in high school educational problems received nation-wide publicity recently when a letter from Allison C. Neff was published in the letters to the editor columns of the *New York Times.*

The full text of the letter, which appeared in the April 13th edition, is reproduced below:

To the editor of the
New York Times:

It was with considerable interest that I read your editorial of April 5 concerning scientific manpower. The sentence which might be described as the keystone of the editorial was "Higher salaries for competent teachers will help, but our basic weakness is traceable largely to our secondary schools, which are simply not good enough when it comes to teaching science . . ."

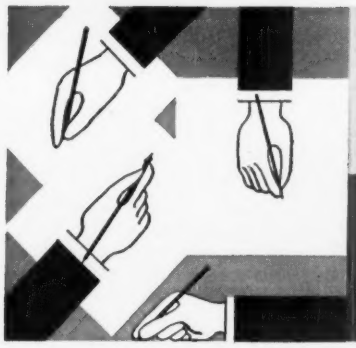
Last year the National Society of Professional Engineers undertook a nation-wide project to bring to the attention of the public some of the more glaring weaknesses of our secondary school system. As a part of this project, the Society wrote letters to 800 publishers of daily newspapers. The letters asked that attention be called to the fact that a decreasing number of young people were enrolling in basic mathematics and the physical sciences. Enclosed with the letter was a reprint of an editorial from the *Times* on this very subject.

The fact that the annual report of the National Education Association on teacher supply and demand for this year shows definite, although small, increases in the number of teachers preparing for the teaching of physics and mathematics is, we believe, a direct result of the widespread publicity which has been given to the shortage of teachers in these fields.

Certainly one of the publications which has been consistently reporting on this topic is the *New York Times.* The members of the National Society of Professional Engineers are grateful to have had a small part, along with your newspaper, in working toward increasing the supply of the nation's high school mathematics and science teachers.

It is to be hoped that the *Times,* as well as other American newspapers, will not let the matter rest here but will continue to urge a greater interest in these vital areas of high school training.

Sincerely yours,
ALLISON C. NEFF, P.E.
President



Professional POSTSCRIPTS

Below is reproduced in its entirety a story as it appeared in a recent issue of the monthly magazine of the Illinois SPE. We agree with the editor of that publication that Mrs. Rhoads' letter deserves wider distribution and so we are happy to reprint it further here. The man referred to, Engineer Royce Johnson, is, of course, vice president of the ISPE.

—PP—

Every once in a while, a person runs across an article which he would like to pass along to his friends. Such a thing recently happened to Vice President Royce Johnson, and upon writing to the publication for permission to use it, they referred him to the author of the letter. Most of her letter is reproduced below. The only parts deleted were those parts which specifically referred to her correspondent in Philadelphia.

The thanks of the Editor and the members of the Illinois Society to Mrs. Rhoads for permission to use her entertaining, thought-provoking letter.

"My Dear Friend,

"An engineer is the product of the most practical of forces — more so probably than that found in any other of the professional outlets. He has no need for the feel of applause, and hence, has made no demand. When accuracy, foresight and inventive genius are creating a kaleidoscope in a man's mind, he is apt to be so intrigued by the brilliance and the angles that acclaim leaves him negative. The engineer himself completely overlooks asking for professional splendor, hence there is no panorama of glory to attract the young man selecting a profession.

"Most surely there is little, if any, advertising on behalf of this profession—we, the beneficiaries, of its far-reaching results are scarcely cognizant of our debt for safety, progress and added leisure: and these facts are probably destined to remain in the dark, for there will be no loud noises from the engineer.

"This man subsists, usually, on an average comfortable salary. Many other professions are more lucrative, but when a man can see the creature of his ingenious design get up and move around, he has something more than is gathered from the mere receipt of gold. In that delight is lost the stamina for demand of loud acclaim. An engineer is of stern stuff—much like 'The Reading Boy' and nothing can make him turn his head or lose his place. (Read Nathalia Crane's 'The Reading Boy.')

"If you can get behind the facade of this strange and wonderful creature—the engineer—you will be rewarded with a sense of humor very sharp and keen and straightforward. But once you have contacted it, bring it out where you can cope with it. To illustrate a point—when I find the haze of engineering ether has my engineer too engrossed, I give him a poem (hobby of mine). After several evenings of sitting in my living room (up to my neck in imaginary water) while a swimming pool was being born, I came up with this:

Pa-Pa designed a swimming pool
With the greatest kind of care.
He used most every kind of tool,
And tore out all his hair.

He assembled board and pencil
On the dining table there—
Made preliminary stencil—
With notations everywhere.

His steel tape and his slide rule
He wore into disguise—
And I saw that paper swimming pool
Transpire before my eyes.

He could not be diverted
And was just a mite displeased—
Not to mention disconcerted
At our vain attempts to tease.

To show him that my very mood
Was one of deep accord—
I posed—as any diver should—
On an unseen diving board.

But Pa-Pa deep in the coma
Of some intricate design
Loses all his sense of humor
For any joke of mine.

But he claims he lost his reason—
His propriety to-boot—
When I came down to breakfast
In a bright red bathing suit.

"With good nature my husband admitted that I had no doubt been banging on the door of his retreat—and justly so. Since I was an engineering secretary—most familiar with terminology, language and temperament of engineers as a whole—I can easily realize that the rest of us live in an inhibited narrow realm, while the engineer has but to step over a threshold into a vast expanse of unknown where he can search to his heart's content the mysteries of things to come.

"Such is the man whom I pull back with my jesting — and like a real sportsman, he will take part in the fun —but watch out, for when I relax my hold upon him, he will creep quietly back into his wide inviting exploration and softly close the door behind him.

Very sincerely,
(Signed) MRS. LOY D. RHOADS
Marion, Ohio"

MAY MEETINGS Of Note

American Institute of Electrical Engineers—North Eastern District Meeting, May 2-4, Sheraton Hotel, Rochester, N. Y.

American Welding Society—Annual Business Meeting, plus Technical Conferences (in conjunction with the Welding Show), May 9-11, Memorial Auditorium, Buffalo, N. Y.

National Rivers and Harbors Congress—National Convention, May 10-12, Mayflower Hotel, Washington, D. C.

Michigan Engineering Society—Annual Convention, May 11-12, Grand Rapids, Mich.

Society of American Military Engineers—Annual Meeting, May 14-15, Washington, D. C.

American Society of Mechanical Engineers (Machine Division)—Design Engineering Conference (in conjunction with the First Design Engineering Show), May 14-17, Convention Hall, Philadelphia, Pa.

Armour Research Foundation—Industrial Nuclear Technology Conference, May 15-16, Museum of Science and Industry, Chicago, Ill.

Purdue University (School of Civil Engineering)—Purdue Industrial Waste Conference, May 15-17, Purdue Memorial Union, Lafayette, Ind.

American Institute of Industrial Engineers—Annual Conference on Fundamentals, Current Practice, and Recent Advances, May 17-18, Shoreham Hotel, Washington, D. C.

Building Research Institute—Annual Meeting, May 21-22, Sheraton-Brock Hotel, Niagara Falls, Ontario, Canada.

Building Officials Conference of America—Annual Conference, May 21-24, Hotel Statler, Hartford, Conn.

NSPE member R. D. Chipp, P.E., who is director of Engineering for DuMont Laboratories, Inc., in East Paterson, N. J., has given us permission to use an interesting piece he has prepared for the *Riverdale Review*, the school paper for the Riverdale Country School, a preparatory school located in Riverdale-on-Hudson, N. Y. Engineer Chipp adds, "I graduated from this school in 1927, and as a graduate who is in the engineering field and concerned with engineering education, I was asked to prepare an editorial of interest to students and recent graduates." Here is Engineer Chipp's *Review* story.

—PP—

Engineering has been defined as "the art and science by which the properties of matter and the sources of power in nature are made useful to man in structures, machines, and manufactured products." Today we are all literally surrounded by highly engineered products. Building materials, construction methods, automatic machines for business use, radio and television for entertainment, nuclear power, transportation in many varied forms, powerful life saving drugs, new textiles, and scores of other things —are all the result of research and engineering on a scale unprecedented in the recorded history of mankind. Even if one were to ignore the tremendous scientific and engineering activity in the development and production of defense weapons, it would still be true that our lives are increasingly dependent upon technology.

In 1954 there were about 200,000 scientists and 650,000 engineers in the U.S.A. More significant than these totals is the ratio of technical effort to over-all productive effort. In 1900 there was one engineer for every 250 persons in the United States working force, whereas in 1950 the ratio was one engineer for each 60 workers. Modern production methods and mechanization of processes will further decrease this ratio. Although the total working force needed to support the production of goods and services is not expected to decrease, there will be significant changes in kinds of work and the required training.

Today engineers are scarce—approximately 25,000 will graduate in 1956. The current needs have been estimated at 35,000 plus an unfilled backlog of some 50,000. Further, it is discouraging to note that since 1900 the percentage of high school students studying algebra has declined from 66% to 25%, and of those taking geometry from over 25% to 12%. These subjects, plus physics and chemistry, constitute the basis for most engineering studies.

It is my belief that a well rounded person should have at least a good basic understanding of physics, chemistry, and mathematics; whether or not a scientific career is planned. In our technical surroundings—this is a minimum for a "well educated" person. Conversely, a "well educated" engineer should have thorough grounding in literature, art, economics, language and history. The day has passed when members of the arts or business world are proud of the fact that they do not know what makes a doorbell ring, or when engineers consider the arts as impractical "long hair" stuff. Leadership today calls for knowledge of both "things" and "people."

An important by-product of engineering training is an understanding of what has been called the "engineering approach" or the "scientific method," nicely described by Huxley as "trained and organized common sense." The strategy used by the engineer involves enumeration of the many factors that relate to the problem at hand, determination of the significance and interrelationships of these factors, followed by classification and grouping, evaluation, application of logical reasoning, and a conclusion based on evidence. This same approach can be successfully applied to the study of many non-technical problems.

Not all men or women make good engineers. A basic aptitude that is found in all successful engineers is Structural Visualization—the ability to visualize in three dimensions or to cope with three variables simultaneously—whether the imagined object be an electron orbit or a bridge. Tests for this aptitude consist of assembling odd-shaped blocks—a three dimensional jigsaw puzzle. Obviously, this aptitude is also necessary in successful surgeons and artists.

Note that an aptitude is an inherent ability rather than a skill that is learned. Among the many aptitudes that can be tested are Design Memory, Number Memory, Tonal Memory, Finger Dexterity, Inductive Reasoning, Subjectivity, etc. The Johnson O'Connor Research Foundation pioneered in the field of aptitude testing and has made notable contributions to it.

If a boy or girl has high Structural Visualization, the probability is great that he or she, given formal engineering training in college, will have a successful and rewarding career in one of the many branches of engineering.

When you study engineering, get sufficient training in the arts as well. Such training will develop cultural balance, will permit evaluation of a problem in its proper environment with due regard to all values, and may offset a tendency to over-specialization and over-conformity with one's successful predecessors. The president of the International Harvester Company said: "The world of specialists is a narrow one, and it tends to produce narrow human beings. The specialist usually does not see over-all effects on the business and so tends to judge good and evil, right and wrong, by the sole standard of his own specialty." In a recent issue

Pennsylvania Society of Professional Engineers—Annual Meeting, May 11-12, 1956, Yorktowne Hotel, York, Pa.

Maryland Society of Professional Engineers—Annual Meeting, May 15, 1956, Park Plaza Hotel, Baltimore, Maryland.

Rhode Island Society of Professional Engineers—Annual Meeting, May 15, 1956, Yacht Club, Providence, R. I.

New York State Society of Professional Engineers—Annual Meeting, May 17-19, 1956, Statler Hotel, New York, N. Y.

Massachusetts Society of Professional Engineers — Annual Meeting, May 19, 1956, Somerset Hotel, Boston, Mass.

New Jersey Society of Professional Engineers—Annual Meeting, May 24-26, 1956, Ambassador Hotel, Atlantic City, N. J.

NSPE Annual Meeting — May 24-26, 1956, Ambassador Hotel, Atlantic City, N. J.

District of Columbia Society of Professional Engineers — Annual Meeting, May 29, 1956, Cosmos Club, Washington, D. C.

California Society of Professional Engineers—Annual Meeting, May 31-June 2, 1956, Modesto, Calif.

Georgia Society of Professional Engineers—Summer Meeting, June 1, 2, 1956, Dempsey Hotel, Macon, Ga.

Missouri Society of Professional Engineers—Annual Meeting, June 1-2, 1956, President Hotel, Kansas City, Mo.

Michigan Society of Professional Engineers — Annual Meeting, June 7-9, 1956, Detroit Leland Hotel, Detroit, Mich.

Utah Society of Professional Engineers—Annual Meeting—June 27, 1956, Brighton Resort, Salt Lake City, Utah.

NSPE Fall Meeting — October 25-26, 1956, The Greenbrier, White Sulphur Springs, W. Va.

West Virginia Society of Professional Engineers—Annual Meeting, October 25-26, 1956, The Greenbrier, White Sulphur Springs, W. Va.

North Dakota Society of Professional Engineers—Annual Meeting, November 2-3, 1956, Grand Forks, N. D.

of the AMERICAN ENGINEER, Dean Weil, of the University of Florida, wrote: "In some ways the growth of the engineer does not differ too greatly from that which occurs in the other professions. The attorney who is expert in technical matters of law and who is not conversant with other broad fields of knowledge will probably not find himself in the upper strata of his profession. So too in the case of the engineer, it must be recognized that unless he has had a relatively broad training he will have to confine himself to a rather narrow field of technology."

When you study engineering, get sufficient training in the fundamental sciences. In the same manner that lawyers and doctors pass examinations before admission to practice, professional engineers pass examinations which include a thorough working knowledge of fundamentals. The New York State examination for professional engineers includes questions on structures, concrete, hydraulics, steam, electrical power, engineering economics, etc., and is the same for all applicants, regardless of their special field of activity.

In summary: First—if you have the aptitudes, engineering offers a successful and rewarding career. Second—if you study engineering, get as wide training as possible before you specialize. Third—regardless of the career you plan, don't neglect basic mathematics or the basic physical sciences. When the scientific approach to problems is commonly understood and used, and when most of us learn to appreciate people as well as things, many surface conflicts-of-interest will disappear and we can expect solutions that are free of prejudice and based on knowledge.

Dr. Weidlein Retires As Mellon Institute Prexy

Dr. Edward R. Weidlein, a member of the Pennsylvania SPE and NSPE, has retired as president of the Mellon Institute of Industrial Research, Pittsburgh. His retirement, which became effective on March 31, immediately preceded his departure on a Federal Government mission abroad.

Long active in the technological, professional, and public service fields, Dr. Weidlein was particularly noted for his leadership in developing the synthetic rubber industry during World War II. He will continue to serve as a member of the board of trustees of the Mellon Institute.

N. Y. Public Works Dept. Announces Job Openings In Albany Offices

The New York State Department of Public Works has announced that it has vacancies for fourteen assistant civil engineers (design) in Albany. A State civil service examination to fill the positions will be held on June 23. Applications will be accepted up to May 25.

The examination is open to any qualified citizen of the United States. To be eligible, candidates must have a master's degree in civil engineering and one year of civil engineering experience, or a bachelor's degree and two years experience. High school graduates may qualify with six years of appropriate experience.

Candidates who fill the jobs will perform work covering the necessary computation and design for all types of bridges, grade separations, canal projects, and other structures.

Applications and additional information may be obtained from the Recruitment Unit, New York State Department of Civil Service, Albany 1, New York.

MEMBERS OF THE NATIONAL COMMITTEE FOR THE DEVELOPMENT OF SCIENTISTS AND ENGINEERS
(See page 17.)

Dr. Howard L. Bevis
President
Ohio State University

Chairman

Dr. Eric A. Walker
Dean of the Pennsylvania State University Engineering and Architectural College

Vice Chairman

Engineering

Mr. Thomas H. Chilton
President
Engineers Joint Council

Dr. Maynard M. Boring
President
American Society for Engineering Education

Science

Dr. Detlev W. Bronk
President
National Academy of Sciences

Dr. Paul B. Sears
President
American Association for the Advancement of Science

Education

Dr. Arthur S. Adams
President
American Council on Education

Dr. Irvin Stewart
President
American Association of Land Grant Colleges and State Universities

Dr. J. Lester Buford
President
National Education Association

Dr. Robert Stollberg
President
National Science Teachers Association

Dr. Leland N. Drake
President
National Association of Secondary School Principals

Management

Mr. Cola G. Parker
President
National Association of Manufacturers

Mr. A. Boyd Campbell
President
U. S. Chamber of Commerce

Labor

Mr. George Meany
President
American Federation of Labor—Congress of Industrial Organizations

State and Local Governments

Hon. Arthur B. Langlie
Governor of the State of Washington
Chairman of the Governors' Conference
Council of State Governments

Hon. John B. Hynes
Mayor of Boston, Massachusetts
President of the United States Conference of Mayors

Dr. Edgar Fuller
Executive Secretary
Council of Chief State School Officers

Humanities

Dr. Fred Eggan
Chairman of the Board
Social Science Research Council

Dr. Howard M. Jones
Chairman
American Council of Learned Societies

N.S.P.E.

Believes

OUR PROFESSIONAL DEVELOPMENT

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

IT IS not uncommon for engineers to become increasingly concerned with professional development as they mature through the years. Most engineers experience an increasing awareness of their responsibilities as professional men as their experience and maturity increase.

Therefore, it is only natural that societies should find their primary activities in the areas of deepest concern to the established engineer. With the increasing importance of technology in the modern world, however, engineers and their societies are recognizing an increasing responsibility to the young man. It is not difficult to divide an engineering career into four general areas:

The first is the area in which interest is stimulated. For those in the fields of science and technology, it is recognized that this must begin early, usually in the junior high school or certainly early in the high school career. Through to the time the student enters college, this interest needs to be stimulated and kept alive.

His next sphere of development is his collegiate training. It is here that he should begin to develop the professional concepts which will guide his activities through later life.

Perhaps his most critical time is the period following collegiate graduation, during the orientation and development stage encompassing his first jobs and the attaining of experience to qualify him as a full-fledged professional.

The fourth stage, of course, is his professional life as a responsible engineer.

NSPE believes it is extremely important for the professional society to serve all four of these areas. NSPE, of course, has long been active in each. Our chapters and state societies are aggressively pursuing programs of vocational guidance, and a number of our activities such as National Engineers' Week and other phases of the public relations program serve to acquaint the young engineer with his opportunities in the profession. NSPE's Education Committee is deeply concerned with the inculcation of professional concepts in the engineering student during his collegiate work.

The over-all program of NSPE is, of course, aimed at activities in areas of primary interest to both the young engineer and the man qualified for full professional responsibility. The Society believes that special attention should be given not only to the problems of the young engineer, but also in the direction of encouraging his participation in professional activities. It is in this period of his development that circumstances and relations with other engineers may have important bearing on his attitudes and future professional development. It is important that he develop associations with those having high professional standards and ideals; but the professional society is handicapped in that the young engineer, in this same period of time, has many other demands upon his time, energies and activities.

NSPE believes, therefore, that it is incumbent upon the Society to pay particular attention to its programs for this group of the engineering profession. It was with this philosophy in mind that the NSPE established as one of its standing committees the Young Engineers Committee. This Committee is charged with the very important responsibility not only of working with young engineers in their first years out of college, but also of endeavoring to appreciate their particular problems and interests and to recommend to the Society specific programs which will be helpful to them. This Committee has already recommended a number of activities to the national organization, as well as its state societies and local chapters. It will recommend to the annual meeting of NSPE a specific program directed to retaining the interest of young engineers in the professional society.

NSPE has long believed, however, that while this Committee should be alert to the specific problems and the unique interests of young engineers, the Society as a whole should make every effort to include these young engineers in all of its activities. It is recommended to state societies and local chapters that young engineers be included on all committees; that they be given an opportunity to provide at least one meeting a year for the entire chapter; that local chapters sponsor special programs of interest for and by their junior members; and that every encouragement be given to these young engineers not only to seek registration at their earliest opportunity, but to take active leadership and participate in the work of the professional organization.

In these times when the brain-power of the Nation is so essential to maintaining our way of life and the defense of the country, the professional society has a deep obligation to do all in its power to encourage the young men to carry on the high traditions and ideals of our profession.

du Pont

(*Continued from page* 13)

haps in professional societies and activities, he seeks to develop and expand his horizons, and in so doing finds ways to make a more useful contribution in his work. Management seeks its future leadership in the ranks of those who are interested enough to give a little extra.

WHAT a man can give in accepting a particular job is more important to his future than what he can get. This is not to say, of course, that cash-on-the-barrelhead is not a matter for serious consideration. But in relation to the future, it may prove to be a superficial or misleading index. For what a man can give will determine the opportunities for advancement and, most important, his personal satisfaction in his work.

In its essential elements, of course, engineering is no different from countless other fields: The only real basis of achievement is performance.

The human fundamentals are the same everywhere. The old-fashioned virtues of persistence, determination, and initiative have not yet been displaced by a portable Univac or become available in synthetic form through the wonders of chemistry. A man who would be a leader must practice in advance the essential qualities of leadership. He can certainly begin his career as a "specialist," using the word in its technical sense, but he must also develop the broader outlook, the "specialization in perspective."

IT IS not easy to lead. The industrial leader of today and of the future has no sinecure. To reach a position of leadership and succeed in that role a man must be willing to take on the hard jobs, the jobs calling for something special in the way of talent and resources, the jobs that others will not or cannot do. He must be alert to what he can give, and must be sensitive to the knowledge, needs, and aspirations of others. He must understand the public as well as the industrial implications of his work, and be willing to accept the responsibility that goes with leadership.

The need for leaders is enormous, and the opportunities it holds for engineers stir the imagination. Leadership in tomorrow's world will be assumed neither by those who know a great deal about a very little or a very little about a great deal. It will be discharged only by those whose thinking is broad and uninhibited, those with grasp and understanding—leaders, in short, whose horizons are wide enough to comprehend the world in which we live.

If we are to be engineers in the broadest sense, engineers of the nation, we must step up to meet this challenge.—***End.***

NSPE Committees Meet In Special Sessions

Looking toward the forthcoming annual meeting of the National Society, and also in the interest of furthering their individual programs, several NSPE committees held special conferences during April.

On April 7, the Registration Committee met at NSPE's new Washington headquarters under the chairmanship of Robert J. Rhinehart, president-elect of the Society. The main business of the meeting was the drafting of an ideal registration law, which will be reported to the NSPE Board at Atlantic City.

The Young Engineers Committee met in St. Louis on April 11 with Chairman Leland Hobson presiding. In addition to the regular committee members, Mr. Rhinehart and NSPE Executive Director Paul H. Robbins were also present.

The Engineers - in - Industry Subcommittee of the Employment Practices Committee met in Washington on April 21 and 22. The main purpose of the meeting, over which Chairman Wayne Ault presided, was to do further work on the development of professional standards for engineering employment. Other items for discussion on the Committee's agenda included the status of the Westinghouse decertification case, the determination of appropriate engineering titles for various positions in industry, and the establishment of organizations for subprofessional employees.

Report Is Available On Outside Employment For Govt. Engineers

Policies Pertaining to Outside Practice by Professional Engineers Employed by Agencies of the Federal Government, a report of the Engineers-in-Government Subcommittee of the Employment Practices Committee, is now available in pamphlet form from the NSPE headquarters office.

The report was considered and approved by the NSPE Board of Directors at the February meeting in Washington. It covers the results of a survey made of Federal agencies employing large numbers of engineers, which was made in behalf of the Subcommittee.

The report states that the majority of the agencies queried take a "neutral attitude" on the question of the desirability of outside engineering activities by their employees. None has a flat prohibition against outside work, while several favor it within defined policy limitations.

The pamphlet will be sent free upon request to the Society.

Letters

(*Continued from page* 5)

is seldom, if ever, abbreviated. Furthermore, "Presiding Elder" was principally used by the Methodist Episcopal Church, North, and the Methodist Episcopal Church, South. The Methodist Episcopal Church, North, changed this terminology many years ago and the Methodist Episcopal Church, South, also changed it in 1939, when the two churches were united. The terminology used since is "Superintendent." I therefore fail to find any conflict there with the use of the initials P.E. to designate Professional Engineer.

T. M. FRANCIS, P.E.,
Birmingham, Alabama

On Pay Checks . . .

Dear Editor:

Frank I. Vilen, P.E., states in the April issue "Letters to the Editor" that the shortage of scientists and engineers is due to:

1. Low salary
2. Improper utilization of the talent
3. Teacher shortage
4. School curricula

Let us stop rationalizing and face the facts. Low salaries have led many scientists, engineers, and teachers into more lucrative fields. The high school student realizes that he cannot get adequate return on his college investment. Compare the *average* wage of the professional and non-professional! Consider the investment (which is wages not earned while attending college), additional expenses for attending college, and give the *average* rate of interest on the investment (excluding taxes) expected or obtained by any successful industry. Anyone who tries these calculations will find at present a college education is a bad investment; it requires many years to *break even*. Sure, these calculations are short term considerations but recruiting more engineers, scientists, and teachers will only make it a long term item.

Look at the industrial advertisements that donate space patriotically to this problem. Study them! Basically the ads or articles show how more engineers can be had for the same price. To me this is blindly leading men to bad investments. The Securities Commission prevents misrepresentation and here we are encouraging it in our own profession. *Why?* Effort should be expended to raise the salary of the presently available and would-be available engineers, and then recruiting would come naturally.

No one is without engineers if the salary is commensurate.

WILLIAM J. KRUSE, P.E.,
Hatboro, Pa.

NEW Processes . . .

Dry-Process Enlarger-Printer Developed

A new type of dry-process enlarging printer, capable of reproducing fifteen standard-size engineering drawings a minute from microfilm originals, was demonstrated by the Radio Corporation of America.

The high-speed, automatic enlarger-printer, which is expected to revolutionize the storage and reproduction of vital engineering drawings, is the first commercially designed machine to utilize the RCA-developed Electrofax dry-photographic process. The equipment is priced at $85,000.

The RCA Electrofax enlarger-printer will be combined with Filmsort equipment developed by the Dexter Folder Company, under contract with the Bureau of Aeronautics, and other processing equipment, to provide for Navy evaluation a completely integrated system for low-cost storage and high-speed processing of engineering drawings essential for the maintenance and modification of naval aircraft.

The high-speed selection and reproduction system will make possible rapid, push-button availability of filed drawings for maintenance purposes and for reference by bidders and suppliers. The Bureau of Aeronautics estimates that the system's potential in direct savings to Naval aviation exceeds one million dollars annually in procurement, reproduction, and storage costs.

The Filmsort system utilizes individual exposures of drawings on microfilm. Each exposure or microfilm frame is mounted on a separate electric accounting machine card to provide maximum freedom and speed of selection. This is in contrast with conventional methods of copying drawings full-scale for filing, or recording them on continuous rolls of microfilm. The Filmsort cards can be selected quickly according to category by conventional electric punch-card machines.

The RCA Electrofax enlarger-printer can be loaded with up to 500 Filmsort microfilm cards, or with standard 100-foot reels of 35mm positive microfilm. The cards are loaded in a rack above the lens system and automatically dropped in front of the lens at the rate of one every four seconds. The roll film, which is fed automatically and horizontally in front of the lens, is inserted in much the same manner that a typewriter ribbon is installed. At the press of a button, the microfilm originals—cards or roll—are fed into the lens system automatically, at a rate of one frame every four seconds.

The development utilizes both the special printing paper and the magnetic "brush" developing technique devised by scientists at the David Sarnoff Research Center of RCA, Princeton, N. J., for high-speed electronic photo-printing on any solid surface. The paper, a commercial-type stock coated with an electrosensitive material, is automatically electrostatically sensitized as it is processed inside the machine. The paper is inserted in the machine in rolls 22 inches wide, 15 inches in diameter, and approximately 3500 feet long.

(*Continued on page* 47)

Arthur L. Malcarney, (right), General Manager, RCA Commercial Electronic Products, discusses control panel operation of RCA Electrofax enlarger-printer with Dr. James Hillier, Chief Engineer.

Alloy Steel Results In Improved Design For Tennessee TV Tower

A major breakthrough in the height barrier of television towers has been accomplished, engineers of Blaw-Knox Company, Pittsburgh tower builders, disclosed.

Prototype of the tall tower of the future will be constructed for WSM-TV, channel 4, Nashville, Tennessee. General Electric is general contractor for the new TV facility.

Pioneering metallurgical research by United States Steel Corporation, resulting in introduction of their USS constructional alloy "T-1" steel coupled with design study by Blaw-Knox produced the technological advances necessary for construction of the new tower.

This alloy steel is approximately three times as strong as structural steels used in many of today's modern skyscrapers. Also, the steel is readily weldable and has the added advantage of having four times the atmospheric corrosion resistance.

Cumulative savings to the buyer pyramid as the weight of the tower goes down. Shipping charges, erection costs, smaller guy wires to support the tower in place and less concrete for anchors and supporting base all figure in the tower bill.

All items are substantially reduced through use of "T-1." In evidence, Blaw-Knox says the steel in the WSM-TV tower will reduce weight by over 100 tons, or 30 per cent of the total weight which would be required with ordinary structural steel.

This advance in tower construction had its beginning three years ago when Blaw-Knox, learning of the new steel, initiated an inquiry with the Corporation. As a result tests were conducted at Lehigh University to establish the columnar strength of USS's new "T-1."

When completed, the massive 1,379 ft., 225-ton structure will be poised on a 3½-inch-diameter steel peg, 10 inches long and pressed-fit into an alloy steel forging six inches thick. This forging is mounted atop a 109-cubic-yard concrete pyramid, which will be buried in the ground. The tower will be guyed by four sets of dual cables attached at four intervals from bottom to top. It will be the tallest man-made structure in Tennessee.

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STRICTLY BUSINESS

Personalities . . . **Arvel B. Klessig** of Fairmont, Minn., has been appointed district engineer serving Minnesota, Iowa, and North and South Dakota for **The Asphalt Institute,** according to **J. E. Buchanan,** president . . . The appointment of **Robert B. Kempe** as chief production engineer of **Crescent Industries, Inc.,** Chicago, has been announced by **Gordon G. Brittan,** vice president. . . . **Octave W. Imer** has been named chief structural engineer at **Anderson-Nichols and Co.,** Boston, Mass., according to **E. Ross Anderson,** senior partner. . . . **Joseph Rosecky** has been promoted to vice president in charge of the **Baldwin-Lima-Hamilton Corporation**'s plant in Eddystone, Pa., according to **McClure Kelley,** president of the Philadelphia firm. . . . **Eugene L. Sembler** is the new chief port engineer for the **Galveston Wharves Company,** Galveston, Texas. . . . **J. K. Lightfoot** has been appointed head of the Engineering Department of **Powder-Power Tool Co.,** Portland, Ore. . . . **Henry A. Oldenkamp** has joined the **Food Machinery and Chemical Corporation,** San Jose, Calif., as manager of central engineering.

Mr. Klessig

Ernest A. Bailey has been appointed application engineer, Transformer and Electrical Equipment Department, **Rumsey Electric Company,** Philadelphia. . . . **Parker S. Dunn,** vice president, manufacturing, of **American Potash & Chemical Corporation** has announced the appointment of **Henry S. Curtis** as plant manager of the company's Henderson, Nev., subsidiary, **American Potash & Chemical Corporation (Nevada).** . . . **Phillips L. St. John** of Binghamton, N. Y., has been named manager of plant engineering at **International Business Machines Corporation's** Airborne Computer Laboratories, according to **Curt I. Johnson,** general manager of the Laboratories. . . . **W. M. Spain** has been appointed North Central regional sales manager for **Federal Pacific Electric Co.** and will make his headquarters in Chicago. . . . **Richard J. Wickert** has been appointed field engineer for the Perfex Division of **General Controls Co.,** Glendale, Calif., according to **W. A. Ray,** the firm's president and chief engineer. Mr. Wickert will be headquartered in Milwaukee.

Mr. St. John

De Soto Motor Corporation, Detroit, has announced the appointment of **William B. Shimer** as chief industrial engineer for that division of the **Chrysler Corporation.** . . . **Norman G. Kappler** has joined **The Lummus Company,** New York City, as pulp and paper industries consultant, according to **J. F. Thornton,** president. . . . **Intrusion-Prepakt, Inc.,** Cleveland, has announced the appointment of **John A. Bader** as chief sales engineer, a newly-created position with the company. . . . **Dravo Corporation,** Pittsburgh, has named **Walter L. Threadgill** methods engineer for its Engineering Works Division. Another new Dravo appointment is that of **Harmon C. Richardson** as assistant manager of the Contracting Division's Shaft and Tunnel Department. . . . The **United States Testing Company,** Hoboken, N. J., has announced the following additions to the staff of its main laboratories: **Melvin Ehrlich** as senior engineer in the Electronics Department; **Thomas V. Books,** project engineer, Mechanical Engineering Department; **George G. Gale,** senior engineer, Materials Engineering Department; and **Dr. Charles Watson Vickery** as a member of the research staff.

Mr. Bader

Changes of Ownership . . . **Everett Frank** and **Harrison Johnston** with a group of associates have purchased control of **Production Research Corporation,** Thornwood, N. Y., a firm specializing in the manufacture of electronic and electromechanical devices. Mr. Johnston, an engineer formerly manager of the International Division of the **Ampex Corporation,** has been elected president. **Leon Hillman** continues as senior vice president. . . . **Walter C. Thompson,** president of **The Torrington Company,** Torrington, Conn., has announced his firm's purchase of the business and assets of **The Progressive Manufacturing Company,** also located in Torrington. The purchased firm, manufacturer of machine screws, nuts, and bolts, will function as a division of **The Torrington Company.**

Operational Expansion . . . Formation of a Nucleonics Research Section in the Research Department of **Stromberg-Carlson,** a division of **General Dynamics Corporation,** has been announced by **Lynn C. Holmes,** director of research. The new section, which will be headed by **Robert L. Deming,** will have the responsibility for the design and development of instruments and control equipment in the nuclear energy field. . . . **The Garrett Corporation** of Los Angeles has announced the opening of new offices for its Aero Engineering Division in Detroit and Cincinnati, according to **Frank Miles,** vice president in charge of eastern operations.

New Firm . . . The organization in Houston, Texas, of **Automatic Power, Inc.,** has been announced by the new company's president, **N. H. Jones.** The firm will manufacture packaged power units designed for unattended operation in remote locations where commercial power cannot be obtained. **R. J. Dodge** is chief engineer of the new firm. **R. C. Lockwood** is vice president, and **John Ryan** is secretary and treasurer.

With Our Members . . .

News from Panama

NSPE Members Organize Engineers' Day In Canal Zone and Republic of Panama

As a result of the original idea and planning of Colonel Hugh M. Arnold, director of the Engineering and Construction Bureau of the Panama Canal Company, Engineers' Day was observed on March 2, 1956, in the Canal Zone and the Republic of Panama. It was hoped at first to arrange the observance to coincide with a date in National Engineers Week, February 19-25, but local conditions necessitated the selection of the later date.

To take charge of the event, a Steering Committee was organized by Colonel Arnold, who is a member of NSPE and president of the Panama Section of the American Society of Civil Engineers. Joseph M. Cooke, design engineer with the Panama Canal Company and a member of both NSPE and ASCE, acted as chairman of the Committee. Other members, in addition to Mr. Cooke and Colonel Arnold, were Robert R. Robertson, director of the Inter-American Geodetic Survey and president of the Canal Zone Post of the Society of American Military Engineers, and Celso Carbonnell, a member of ASCE and president of the Panama Society of Engineers and Architects.

Major General John S. Seybold, USA, Ret., the Governor of the Canal Zone, and Ricardo Arias Espinosa, President of the Republic of Panama, each issued proclamations designating March 2 as Engineers' Day.

The highlight of the Day itself was a reception at the Union Club in Panama attended by Governor Seybold, President Arias, various other dignitaries, and approximately four hundred engineers and their guests. A speech made by the Governor was broadcast during the reception.

Press coverage of the observance, however, was spread over an entire week. Several engineering luncheons emphasizing the event were scheduled prior to the Day, and the Panama Canal Company provided material for an exhibition that was located at the University of Panama. Local engineers also spoke at service clubs and in the high schools as part of the observance.

Much of the material provided by NSPE for the regular Engineers' Week observance was used in planning and executing the Panama program. Because of the success of the program, it is planned to repeat it next year. (For photographs of the Engineers' Day activities see the pictorial roundup on page 39.)

Ohio P.E.'s Tour Mansfield Steel Mill

The April meeting of the North Central Chapter of the Ohio Society was devoted to an inspection tour of the Empire Steel Corporation's Hot Strip Mill at Mansfield. Mill officials accompanied the engineers and their guests on the tour.

"Professional Climate" Is Youngstown Topic

Wayne E. Ault, chief engineer of the Automatic Sprinkler Corporation, Youngstown, Ohio, was the principal speaker at a recent meeting of the Lorain County SPE. Mr. Ault's address was entitled *A Professional Climate for the Engineer in Industry*, and his audience included representatives of twelve local industries employing engineers. He cited in particular the efforts which have been made by NSPE in studying the role and problems of the professional engineer in the industrial field.

Special honors were paid during the meeting to Burt Nichols, a chapter member who has recently celebrated his 83rd birthday and his 56th year in the engineering profession.

Illinois Society Holds Annual Meeting

Members of the Illinois SPE convened at the Morraine-on-the-Lake Hotel in Highland Park on April 12 for the first session of the Society's three-day annual meeting. Business, professional, and social events alternated in the program that lasted through the afternoon of the 14th.

President Dwain M. Wallace called the meeting to order. An address of welcome was delivered by August Cepon, chairman of the Lake County Board of Supervisors.

Other prominent speakers included NSPE President Allison C. Neff, Governor William G. Stratton of Illinois, and Austin L. Wyman, chairman of the Illinois Toll Road Commission.

A tour of the Portland Cement Association's Laboratory was another highlight of the meeting.

WITH THE LADIES—The photograph at the left, below, was made during the charter meeting of the Ladies' Auxiliary to the Weirton Chapter of the West Virginia SPE. Seated, left to right, in front are Mrs. J. B. Stout, Mrs. Martin H. Pohjohla, Mrs. Ray O. Bowman, and Mrs. Orville Monroe. Behind them, left to right, are Mrs. Robert T. Lucas, Mrs. Alex W. Jurvic, Mrs. Charles J. Gates, Mrs. H. Kermit Fish, Mrs. Frank LePera, Mrs. Wm. L. Barr, Mrs. J. R. Martin, Sr., Mrs. Charles N. Pletcher, Mrs. Roland F. Bangert, Mrs. John R. Martin, Jr., Mrs. L. A. Fugassi, Mrs. Harry H. McFeely, and Mrs. Edwin T. Smith. Mrs. John R. Martin, Jr., was elected president of the Group; Mrs. Pletcher, vice president; Mrs. Fish, secretary-treasurer; and Mrs. Jurvic and Mrs. Bowman, directors.

Another new auxiliary is that organized for the Blue Water Chapter of the Michigan SPE. The picture at the right was taken during the organizational meeting. In front, left to right, are Mrs. R. Crist, Mrs. D. Wells, and Mrs. M. Chambers. Standing are Mrs. E. Volick, Mrs. K. Wilkens, Mrs. E. Falls, Mrs. C. Cronenworth, Mrs. R. Cosgrove, Mrs. J. Reed, Mrs. F. Crist, Mrs. L. Dunn, Mrs. F. Hendrick, Mrs. R. Brandt, and Mrs. A. Sokoloff. Officers nominated at the meeting were Mrs. Reed, president; Mrs. Falls, vice president, and Mrs. P. Bruce (not pictured), secretary-treasurer.

Highway Movie Shown In North Carolina

The second of a series of programs centered around the various public services administered by the State of North Carolina emphasized the activities of the Highway Department for the members of the South Piedmont Chapter, meeting recently in Charlotte.

James S. Burch, engineer of statistics and planning with the Department in Raleigh, gave the principal address. A movie on "Highway Modernization in North Carolina" was also shown. Peter Bourke, official roadway photographer for the State Highway Commission, likewise participated in the program.

The program series highlighting the various State departments has been arranged by William Crist, vice president of the Chapter.

Panel Discussion In Milwaukee

The April 10th meeting of the Milwaukee Chapter of the Wisconsin Society was devoted to a panel discussion of the development of the engineering profession. Three specific subjects were covered during the program: Engineers and Unionism; Legislative Liaison; and Large Consulting Offices and Engineering Departments vs. Small-Scale Individual Operations.

Oklahoma Auxiliary Establishes Scholarship

The Ladies' Auxiliary to the Oklahoma SPE, through its Scholarship Committee, has recently announced its sponsorship of a $200 annual scholarship award. Recipients will be engineering students at Oklahoma University, Tulsa University, or Oklahoma A&M College.

The initial award, for one semester and, therefore, worth $100, has been made to Ross C. Anderson, a senior electrical engineering student at the University of Oklahoma.

Mrs. J. Roy Black is chairman of the Auxiliary's Scholarship Committee, which organized the establishment of the scholarship fund.

City Officials Address Toledo P.E.'s

Members of the Toledo Chapter of the Ohio Society heard talks on major improvements that are being proposed for the city given by City Manager John J. McCarthy and Service Director John R. Alspach, when they met recently in the Toledo Elks Club. A question-and-answer period followed the presentations by the two officials.

Chief among the items discussed was the new Toledo Expressway System on which construction has already begun.

Jose Calva Addresses Western Wis. Chapter

José B. Calva, president-elect of the Minnesota Society of Professional Engineers, was the guest speaker at the April 3rd meeting in La Crosse, Wisconsin, of the Western Chapter of the Wisconsin SPE. Mr. Calva, a well-known chemical engineer who is president and technical director of J. B. Calva & Co., Minneapolis, discussed recent advances in the chemical engineering industry.

Mr. Calva is particularly noted for his development of "Calva Process" for the conversion of wool by which ordinary sheepskin is made to resemble fine furs.

Geologist Is Syracuse Meeting Guest

Dr. Earl T. Apfel, chairman of the Geology Department, Syracuse University, was the guest speaker at the April 10th meeting of the Centeral New York Chapter of the New York State SPE. The meeting was held at the Syracuse Museum of Fine Arts, and Dr. Apfel spoke on the subject, "The Geology of the Central New York Area."

The Chapter is now planning its annual dinner meeting, which has been scheduled for May 8.

. . . *more news on page 4*

THE STORY WE CAN'T CONCLUDE — Last month the *American Engineer* carried a text-and-photo roundup of the 1956 Engineers' Week story. We planned that it would be the "last word" on the highly successful February event. However, since the April issue went to press, many more fine reports have been received. The *American Engineer* is proud, therefore, to present on the opposite page another photographic survey of highlights that have been called to our attention during the past month. We can't seem to conclude the Engineers' Week story, but we are sure that P.E.'s everywhere will be glad to see this chapter in the record of the Week's accomplishments.

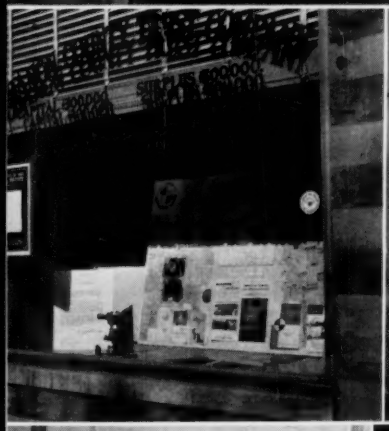
Top row, first photo: **This is a display arranged by the engineers of the St. Joseph Valley Chapter of the Indiana SPE and exhibited in South Bend; it includes a copy of the first atlas of the county published in 1825 and historical instruments.** ***Second photo:*** **Arthur Darlow receives the congratulations of Charles K. Lingo, president of the Miami Chapter of the Florida Engineering Society, as he is presented with the Society's Certificate for Outstanding Service. The ceremony took place at the Engineers' Week banquet on February 25, the first annual meeting of the newly-merged Miami Chapter of the former FSPE and the Professional Engineers Association of Southeast Florida.** ***Third photo:*** **NSPE President Allison C. Neff arrives in Wichita for the Kansas Engineering Society meeting during the Week. L. to r., are C. L. Trapp, William Lennox, Orval W. Daniels, Mr. Neff, Leland Hobson, Dr. Reed F. Morse, E. J. Karsten, and K. M. Hale.**

Second row, first photo: **C. Arnold Dutton (left) receives the Erie County Chapter Award from Paul Mohn, while NSPE Executive Director Paul H. Robbins (center) looks on.** ***Second photo:*** **Participants in an Alabama TV program are, l. to r., Jack Cress, Birmingham Public Schools guidance councilor; James Lucas, civil engineering student of the University of Alabama, and James A. Evans, a consulting engineer.** ***Third photo:*** **This display, sponsored by the Western Society of Engineers, one of the many organizations cooperating with NSPE in the Week, was shown in the Exhibit Window of the Illinois Bell Telephone Company, Chicago.**

Third row, first photo: **This window display was sponsored by the Lebanon County Chapter of the Pennsylvania Society.** ***Second photo:*** **Assembled for the presentation of the New York City proclamation are the presidents of the five metropolitan chapters. L. to r., are Carl Bauman, Kings County; Elias Elvove, New York County; L. W. Larsen, Richmond County; Hon. Dr. John J. Theobald, Deputy Mayor of the City of New York; Otto Mald, Bronx County; and Nathaniel C. Saxe, Queens County.** ***Third photo:*** **This photo was made at the "Engineers' Day" reception in Panama. Second from the left is Ricardo Arias Espinosa, president of the Republic of Panama, talking to Canal Zone Governor John S. Seybold, Maj. Gen., USA, Ret. (center).**

Fourth row, first photo: **The proclamation is signed in Syracuse, New York. Seated, l. to r., are Dr. George O. Haller, Mayor Donald H. Mead, and Minot H. Pratt. Standing are Earl F. O'Brien and Henry L. Galson, president of the sponsoring Central New York Chapter.** ***Second photo:*** **This shows an exhibit in Algoma, Wisconsin, sponsored by the Fox Rixer Valley Chapter of the WSPE.** ***Fourth photo:*** **In this scene at the Engineers' Day exhibit at the University of Panama, Lt. Col. J. E. Vick, Jr., USA, of the Inter-American Geodetic Survey, is demonstrating a theodolite.**

. . . The 'Week' Made History . . .



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Accomplishment Record Is Set in Ohio

Reports of outstanding professional accomplishments, including the gaining of 500 new members, and plans for the forthcoming administrative year were among the chief items of interest to the members of the Ohio SPE, convening in Dayton for their convention late in March. The event was held in conjunction with the NSPE State Presidents' Conference. (For a story on the national aspects of the meeting, see page 25 of the April AMERICAN ENGINEER.)

One of the highlights of major interest to the OSPE members was the installation of new officers for the coming year. Those elected during the meeting to serve with OSPE President Alfred H. Samborn were: Elmer S. Barrett, H. Bruce Baty, and J. Warren Kinney, Jr., vice presidents; John E. Gilkey, secretary; and Earl L. Hineline, re-elected treasurer.

Each of the Ohio Society's seven functional groups held one or two-day sessions and elected officers for the coming year. Chairmen of the groups are as follows: Leroy Roush—County Engineers; George J. Stoll—Education; David Selvar—Private Practice; Loy Rhoads—Industry; W. W. Althar—Highway Engineers; Arthur D. Caster—Municipal Engineers; F. K. Harvey—Public Utilities; and Ronald A. Gordon—Engineers in Contracting.

Another feature of the convention was the Saturday conference for students and young engineers on March 24. Robert I. Mitchell of the Duriron Company, Dayton, was the principal speaker at this session, discussing "Engineering and Professionalism."

NSPE President Allison C. Neff took part in various Ohio functions.

. . . more news on page 43

OHIO Guests — Pictured during the Dayton meeting, left to right, are: NSPE Vice President Warner Howe, NSPE President Allison C. Neff, OSPE National Director Raymond A. Freese, NSPE President-elect R. J. Rhinehart, and OSPE National Director Paul A. Harlamert.

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Joint Meeting of Two New York Chapters

"Engineering Aspects of Atomic Energy Development" was the subject discussed by Joseph Waitkus, the guest speaker at a recent joint meeting of the Chautauqua-Cattaraugus and Steuben Chapters of the New York State SPE. Mr. Waitkus, assistant to the technical manager of Air Preheater Corporation, told of the qualifications that will be necessary for the new nuclear engineer who will carry out the development of atomic energy potential.

The meeting was held on April 4 at the Hotel Fassett in Wellsville.

NEW SOUTH CAROLINA CHAPTER — Announcement has been made by Thomas A. Able, Jr., president of the South Carolina Society of Professional Engineers, of the chartering of the new Spartanburg Chapter by the State Society. The picture at the right was made during the charter meeting.

Left to right are: Mr. Able, making the presentation of the charter; Russell H. Bush, vice president of the Spartanburg Chapter; Harold B. Swygert, Jr., president of the new P.E. group, and James A. Gillespie, secretary-treasurer.

Editor Addresses Indiana Group

Members of the Southwestern Chapter of the Indiana SPE held a dinner meeting recently at the Lamplight Inn in Evansville, at which Earl Richert, editor of the *Evansville Press* was the guest speaker. Mr. Richert discussed both the newspaper business and the need for industrial expansion in the Evansville area.

Fresno Chapter Aids Science Fair

Members of the Fresno Chapter of the California SPE joined in support of the Fresno Junior Science Fair, which was sponsored during April by the local Lions Club. The Chapter made its contribution by providing awards for student exhibitors in the fair.

. . . more news on page 44

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Atomic Energy in Georgia Is Program Theme

"The Utilization of Atomic Energy —Its Future in Georgia" was the theme of a recently-reported meeting sponsored by the Atlanta Chapter of the Georgia SPE. The program was in the form of a panel discussion followed by a question-and-answer period.

Members of the panel were Dr. William B. Harrison, associate professor of mechanical engineering, Georgia Tech; Dr. Earl W. McDaniel, research assistant professor, Georgia Tech; Dr. Marion L. Meeks, research associate professor, Georgia Tech; and Francis C. Smith, editor-in-chief, *Southern Power & Industry*.

Education Was Topic In San Jose

Dr. William Lorrel of the engineering faculty, San José State College, was the featured speaker at the annual meeting and banquet of the San José Chapter of the California SPE, held on April 10 at the Hawaiian Gardens. The theme of Dr. Lorrel's address was a comparison of American and European concepts and methods of education.

Nike Missile Is Program Topic

The New York Telephone Company provided the program for a recent meeting of the Kings County Chapter of the New York State Society. The subject of the program was the "Nike," the new anti-aircraft guided missile.

McCullough Addresses Nueces Chapter Meeting

G. W. McCullough, vice president and chairman of the operating committee of the Phillips Petroleum Company, Bartlesville, Oklahoma, was the guest speaker at the April meeting of the Nueces Chapter of the Texas SPE. Mr. McCullough, who is a national director of NSPE and a past president of the Oklahoma SPE, spoke on the subject, "The Engineer in the Petroleum Industry."

Judge Discusses Professionalism

Judge Harold M. Cook, former prosecuting attorney for the Alabama State Bar Association, was the guest speaker at a recent meeting of the Birmingham District Chapter of the Alabama SPE. Judge Cook spoke on the organization and problems of the legal profession in line with the general subject of *Professionalism*, which is the theme of the Chapter's current series of lectures.

Briefs

(*Continued from page 7*)

Wright Brothers Medal Goes to Californian

The Society of Automotive Engineers has honored Wendell E. Reed, project engineer with the Solar Aircraft Company, San Diego, California, with the presentation of the Wright Brothers Medal. The award, which is given in recognition of outstanding contributions to the existing knowledge of aeronautics, was presented on April 10 during the Society's national aeronautical meeting in New York. Mr. Reed is particularly noted as the inventor of the Microjet control.

Kirkwood Chairmans Selective Service Advisers

A. C. Kirkwood, president-elect of the Missouri SPE, has recently been elected chairman of the Missouri Advisory Committee on Scientific, Engineering and Specialized Personnel for the Selective Service System.

Other regular members of the Missouri advisory group are C. Y. Thomas, vice president, Spencer Chemical Company; Dr. Charles M. Kimball, president, Midwest Research Institute, and Wesley M. Johnson, field manager, Kansas City Field Office, Atomic Energy Commission.

Distinguished Service Recognized by Missouri U.

Five noted American engineers received the bronze medal signifying the Honor Award of the College of Engineering of the University of Missouri during a recent convocation on the University campus.

Dean Huber O. Croft presented the medals to Dr. J. Brownlee Davidson, professor of agricultural engineering at Iowa State College; William G. Purdy of Baltimore, noted for his work in the development of rockets and guided missiles; Louis H. Winkler of Bethlehem, Pennsylvania, metallurgical engineer and steel manufacturer; George A. Delaney of Pontiac, Michigan, a well-known automotive engineer; and Procter Thomson of Cincinnati, Ohio, a chemical engineer who has achieved distinction in the field of standardization and quality control. All except Dr. Davidson are graduates of Missouri.

Columbia U. To Sponsor Utility Management Workshop

Human relations will be stressed during the fifth annual Utility Management Workshop to be sponsored by the Department of Industrial and Management Engineering of Columbia University. The executive development and training conference is scheduled for Arden House, Harriman, New York, from July 29 to August 10.

New International Awards For D. B. Steinman

NSPE's first president — D. B. Steinman, the internationally-famous New York bridge engineer—has been notified that he is to be the recipient of two new decorations in recognition of his professional and technological achievements. Dr. Steinman has been accorded honorary membership in the *Academie Universelle* (Paris), and he has also been selected to receive the diploma and gold medal of the *Associazione de Cultura Litteraria e Scientifica* (Geneva).

(*Continued on page 47*)

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HEATERS, HEATING DEVICES—The General Electric Company has released a 60-page bulletin, "Electric Heaters and Heating Devices 1956," containing application index, calculating data, specifications, operating information, and list prices of standard G-E heaters and heating devices. Included are immersion, strip, cartridge, tubular, fin, and railroad switch heaters; unit heaters, soldering irons, glue pots, soft-metal melting pots, oven equipment, and control. Process and application index shows methods of heating and type of heater recommended for various heating processes. Request Bulletin GEC-10056 from the General Electric Company, Schenectady 5, New York.

—AE—

MINIATURIZATION — A 12-page brochure outlining its facilities for sub-contract work in the field of miniaturization has been prepared by the ordnance division of Elgin National Watch Company. The booklet sets up various applications of watch industry skills in the new field and graphically explains how these skills can be utilized by other industries. The new brochure is available without cost by writing Practical Miniaturization, Ordnance Division, Elgin National Watch Company, Elgin, Illinois.

—AE—

2-WAY RADIO — An attractive booklet entitled "Increased Profits for Concrete Producers through Complete Control of Ready Mixed Trucks with RCA 2-Way Radio" has just been issued by the Communications Products Department of the Radio Corporation of America. Through the use of actual case histories, this colorful 10-page brochure details the ways in which ready mixed producers are using mobile radio to increase profits through greatly increased efficiency. Copies of this brochure are available on request to: R. Z. LaTerza, Building 15-1, Radio Corporation of America, Camden 2, New Jersey.

—AE—

FIRE PUMPS—The description and illustration of new underwriters' approved fire pumps, six easy-to-read pages of the most complete fire pump selection charts and a set of "typical" fire pump specifications are some of the features of the new and expanded 36-page fire pump bulletin just published by the Peerless Pump Division, Food Machinery and Chemical Corporation. Fire pump selection charts in the bulletin, which list over 120 different approved fire pumps, are tabulated in two ways. Copies of this new Peerless Fire pump bulletin may be obtained by writing the Manufacturer Peerless Pump Division, Food Machinery and Chemical Corporation, 301 West Avenue 26, Los Angeles 31, California and requesting Bulletin No. B-1500.

—AE—

OXYGEN ANALYZER—New 16-page color catalog, 55-829-56, explains principle, construction, operation and features of both the paramagnetic type Magno-Therm analyzer and the electronic recorder. A chart of major applications lists functions, examples of services, and how and why this analyzer is used. Special models are also described. The Hays Corporation, Michigan City, Indiana.

PRESSES—Double Action Straight Side Presses ranging from 200-ton to 2000-ton capacity are shown in a catalog recently published by Danly Machine Specialties, Incorporated. One-, two- and four-point suspension presses and bed-sizes up to 228" x 108" with complete specifications and dimensions are included in this illustrated, 28-page book. For copies of the Danly Double Action Straight Side Press Catalog, write to Danly Machine Specialties, Incorporated, 2100 South Laramie Avenue, Chicago 50, Illinois.

COLOR MOVIE
"THE TENANT AT 1010 MAIN"

"The Tenant at 1010 Main" is the title of a new full-color motion picture just released by General Electric to dramatize problems of electric power distribution in large commercial buildings.

A 32-minute film, it is designed for viewing by technical audiences.

Produced for General Electric by Wilding Picture Productions, Inc., the movie traces the transformation of a building manager who discovers that scrimping on electrical systems 20 years ago is costing him tenants today. He finds that a higher voltage, 480Y/277-volt system for a new commercial building will save him enough to install a similar system in the now obsolescent building at 1010 Main.

The "Tenant at 1010 Main" is available free on a loan basis or may be purchased at cost from the Apparatus Sales Division, Schenectady 5, New York.

VERTICLOSED PUMP MOTORS—Embodying 66 full-colored illustrations and technical drawing depicting features and applications of various types of vertical turbine pump motors, a new brochure is ready for distribution by U. S. Electrical Motors Incorporated. It describes hollow shaft Verticlosed grease- and oil-lubricated motors in sizes from 1½ to 400 hp; also single phase designs up to 7½ hp, and totally-enclosed types up to 150 hp. Various arrangements of bearing settings are presented. Graphs showing relation of thrust bearing life to contact angle, and starting characteristics of part-winding increment start motors are of especial interest to pump engineers. Request Verticlosed motor Bulletin #1903, U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, California.

—AE—

PRECAST CONCRETE — This 16-page booklet, "Schools with Flexicore," devotes eight pages to plans and detail drawings of recent projects designed by outstanding school architects. Common denominator of these schools is floors and roofs of Flexicore slabs which make firesafe concrete construction possible at low cost. Along with drawings showing typical usage, it illustrates how this system speeds up construction and how the structural units can provide finished, low-maintenance ceilings, heating ductwork and easily-handled overhangs. For booklet and more information, write the Flexicore Company, Inc., 1932 E. Monument Avenue, Dayton 1, Ohio.

SOLENOID VALVES—A new, comprehensive catalog from Atkomatic Valve Company, Inc. describes the company's complete line of electrically operated two-way solenoid valves for air, gas, steam and liquid flow control. Free on request, the catalog lists available dimensions, specifications, pressures and applications of solenoid valves in bronze and stainless steel. Describes the Atkomatic "By-Pass" Valve which permits external adjustment of operating speed. Where pressure ranges of 0 to 150 psi are indicated, the application of the bronze, semi-direct lift valves for ½" to 1" pipe sizes is described. Also contains numerous coil and flow charts and other useful information. To obtain this up-to-date engineering guide, write for Catalog 200, Atkomatic Valve Company, Inc., 545 W. Abbott Street, Indianapolis, Indiana.

—AE—

REDUCTION GEARS — A new booklet that describes high-speed reduction gears for mechanical-drive steam turbines is available from the Westinghouse Electric Corporation. Having capacities ranging from 50 to 5000 horsepower, the reduction gears are designed to bring the efficiency of the high-speed steam turbine to slower-speed driven equipment such as pumps, fans, compressors, line shafts, and generators. Illustrated profusely, the booklet describes in detail the various parts of the gear assembly and lists complete dimensional and weight specifications. Included also are drawings of the assembly. For a copy of booklet DB 1165, write to Westinghouse Electric Corporation, P. O. Box 2099, Pittsburgh 30, Pennsylvania.

—AE—

CONCRETE GUNNING—The Air Placement Equipment Company announces the availability of a new complete line 16-page catalog which not only gives complete details, specifications and operating capacities of the equipment, but contains the answers to many, often-asked questions about air placed or gunned concrete. Also included are several pages of actual job application photographs showing the many and varied uses of this modern equipment. A feature of the catalog is the complete description of the new Airplaco portable concrete gunning rig. Copies of this new catalog may be secured from local Airplaco distributors or by writing direct to Air Placement Equipment Company, 1009-11 West 24th Street, Kansas City 8, Missouri.

—AE—

HIGH SPEED INDEXING — Ferguson Machine & Tool Company's new 24 page Catalog No. 106 contains full selection and application data on their high speed indexing mechanisms now available from stock with lower prices and immediate delivery. Included are methods of calculating load requirements, load ratings based on a minimum of 8,000 hours operation without maintenance and dimensions of the many stock and standard Ferguson Drives. The catalog also introduces the new "Trans-Pac," a standard packaged power unit for indexing straight line assembly machinery. Write to Ferguson Machine & Tool Company, P. O. Box 5841, St. Louis 21, Missouri.

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims.

Briefs

(*Continued from page* 45)

Florida U. Announces New Ph.D. Program

The Department of Civil Engineering, College of Engineering, University of Florida, has announced the inauguration of new programs of graduate study in sanitary engineering leading to the degrees of Master of Science in Engineering and Doctor of Philosophy in Sanitary Engineering. Courses are in the fields of water supply and wastes engineering, sanitary engineering design, and general sanitary engineering including environmental sanitation, air pollution, and radiological health.

Graduate assistantships in research are available annually for a number of students.

Full information is available from the office of the Dean of the Graduate School at the University in Gainesville.

❁

Lamme Medal To Hanna

The American Institute of Electrical Engineers has announced the selection of Dr. Clinton R. Hanna as the recipient of the Institute's Lamme Gold Medal for 1955. The award will be given to Dr. Hanna, who is associate director of research, Westinghouse Electric Corporation, East Pittsburgh, Pennsylvania, on June 25 during the AIEE's summer general meeting in San Francisco.

❁

Pratt To Have Graduate Courses

Francis H. Horn, president of Pratt Institute, Brooklyn, has announced that the Institute's Board of Trustees has voted to approve graduate work in engineering to begin in September, 1956. Courses will be given in the evening but will be administered by the faculty of engineering of the undergraduate day school.

❁

New Processes

(*Continued from page* 34)

The paper, which is several thousand times faster than blueprint paper, operates automatically at a speed of 23 linear feet per minute. The paper is exposed by the light images of the microfilm originals as they are processed through the lens and projection system. When the charged paper is exposed, its electrostatic charge in the areas exposed to light is reduced, leaving a latent image in the non-exposed areas. The latent image is then "developed" by the automatic passage of magnetic "brushes," across the exposed paper. The "brushes" consist of a mass of iron filings mixed with a pigmented resin powder carrying a positive electrostatic charge. When the magnetic "brushes" sweep across the exposed paper, their positively charged powder clings to the negatively charged areas of the exposure. The original image is revealed instantly as the particles cling to the negative areas of the latent image.

The developed image is fixed permanently as the paper moves through a dry temperature "bath" which causes the powder to bind itself to the coated surface of the paper. The fixed exposure becomes a bonded, non-fading image.

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Classification

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Such assignments involve the assumption of responsibility for a continuing function as implied in the illustration in the paragraph above. They involve self-direction, and the ability to arrange one's own time and to organize work so that the several parts of the job or several concurrent activities are brought together to accomplish stated objectives on schedule. They involve self-appraisal of one's own work so that the completed results will be adequate for use with only a minimum of review.

Grade 4 is essentially a non-supervisory grade level. Assignments may involve the distribution of one's "chore work" to service organizations such as drafting units and technical laboratories; or they may include the use of one or more assistants sharing the work load; but this use of other people to increase one's own productivity must be distinguished from the type of supervision found at Grade 5 and Grade 6 discussed next. Also, Grade 4 may be used for supervisors over aides or over work production units staffed by Assistant and Associate Engineers. Such assignments will not require the full range of engineering described here as characteristic of Grade 4; they require a knowledge of the segregated work supervised. In this respect they differ from the true Supervisory Engineering described later as Grades 5 and 6; and they warrant Grade 4 only by grade differential as discussed later.

Definition and Use of Grades 5 and 6— Senior and Principal Engineers

Grades 5 and 6 apply essentially to supervisory positions. They apply also to staff positions and positions of specialists. The three uses are best described separately.

Supervisory Positions at Grades 5 and 6

Supervisory grading basically follows the simple rule that the Supervisor's grade should be higher than the grade of his subordinates. But this rule is deceptively simple, and by itself furnishes little help. When inexpertly used it often results in "pyramid" or "Christmas tree" grading, and an easy introduction of errors. So supervisory grading requires more than adding on an extra grade.

First, supervision is not a simple job characteristic, nor of a single degree of responsibility; and supervisory grades will obviously run beyond Grade 6. So it becomes necessary to distinguish types of supervision, and to determine their relative grade values. This will be a matter of definition, and no one definition will be necessarily the only correct one. But if there is to be a classification system, definitions must be drawn even though they are arbitrary. It follows then, that correct grading of supervisory positions within an organization, and consistency of grading from one organization to another, become, first, a matter of adhering to whatever definitions and system is agreed upon; and, second, a matter of analysis and evaluation of individual positions against those definitions. No simple rules will be useful except as a starting point for such evaluation.

The definitions drawn below and the system described are adapted from the Federal classification plan prescribed by an Act of Congress. In a private corporation the system would be prescribed by management, and fewer or more grades could be used without violation of any fundamental principle of classification. This applies also to the number of grades defined below the "benchmark" set here at Grade 4.

In the system described here, Grades 5 and 6 are applied to "professional" supervisory positions, and Grades 7 and up to "executive" supervisors.

Professional supervisory positions are those in which the requirements for personal qualifications to perform the professional work remain an important or paramount element in the assignments. Supervisors in these positions remain close to the work, providing professional leadership to the supporting staff and personally resolving technical difficulties. Supervisory duties of organization, administration and control of work assignments are present, also, and are by no means secondary; but they do not become primary as in the higher executive-type positions.

Normally Grade 5 applies to positions of supervision over employees at Grade 4 and below who are engaged in substantially the same kind of work; whereas Grade 6 applies to supervision over subordinate organizational units performing related but none-the-less different work. Usually the sub-unit supervisors will be at Grade 5, raising the over-all supervisor to Grade 6. But here is the oversimplified "pyramid" grading; and additionally a too simple use of such terms as *units* and *sub-units*, and *substantially the same but different work*, which will have different meaning and different values in different situations. Nor will such grading take account of many realistic variations in staffing patterns.

In practice then, such supervisory positions must be graded by dividing them between the two grades by comparative evaluation. And the basis for this comparison must be such factors as scope of knowledge and experience required to control the work supervised, the extent and complexity of the supervisory problems involved, the extent and character of the delegated responsibility, or conversely, the extent and character of the supervision retained by a higher supervisory authority. This evaluation in turn is dependent upon a detailed analysis of the position, considering such individual job conditions, for example, as whether the higher supervisory authority advanced to his position from the same engineering field and hence will exert a technical control, or advanced from a diverse field and must rely on the technical competence of the subordinate Supervisor.

Staff Positions at Grades 5 and 6

Staff positions have many of the same characteristics as the professional supervisory positions. Employees in such positions are first of all experts in their professional field. They normally represent a higher organizational authority, furnishing technical assistance to operating offices on problems exceeding the knowledge, experience, or authority of the operating personnel. These staff positions usually involve no responsibility for "line" supervision over personnel; but they do involve such supervisory duties as the interpretation of program objectives, definition of standards, and review of work.

These characteristics of staff positions demand full professional qualifications plus additional competence and leadership; and consequently grade above the work they control by the same rule as the preceding supervisory positions. Thus the actual grade is dependent upon the grades in the operations they serve. This may in some instances be influenced by the supervisory grades over that work. Therefore, the grading of staff positions is not limited to Grades 5 and 6, nor can a line be drawn between these and the higher grades as neatly as in the case of other supervisors. Again the grading may be determined by comparative analysis; with the evaluation based principally upon the scope of knowledge and experience required and the responsibility as measured by the decisions made and authority exercised.

Specialist Positions at Grades 5 and 6

Specialist positions are defined as those working in

Further GS-17 Increase Urged in Letter To Senator Johnston

In a recent letter to Senator Olin D. Johnston, chairman of the Senate Post Office and Civil Service Committee, NSPE Executive Director Paul H. Robbins has called attention to the Society's endorsement of the proposed legislation, "Executive Pay Act Amendments," including Title III, "Classification Act Amendments" (S. 2628).

In writing to the Senator, however, Mr. Robbins also pointed out that the disparity between industrial and Federal salaries for engineers becomes even more pronounced in the higher grades of employment. He, therefore, offered the Society's recommendation that the Senate Committee "endeavor to make the potential increase for the GS-17 more significant to the extent possible."

As the bill stands now, its passage would add a fifth step to the GS-17 grade allowing an increase to $14,835, compared to the current highest possible step of $14,620, but a relatively small increase when contrasted with the salaries offered to top engineers in industry.

---

a specific phase of a professional field, but requiring both the basic knowledge of the whole field plus additional knowledge gained through advanced study and intensive experience. Such positions involve the development of ideas into plans and programs, originality in resolving unprecedented problems, and creativeness in meeting new situations. They require not only a knowledge of the established principles in the field, but additionally the theoretical sciences underlying these principles. Specialist positions (perhaps contradictory to the term) require a knowledge broader than the basic profession; a knowledge reaching into related fields. For example, the electrical engineer specializing in hydro-power generation will require a knowledge of mechanical engineering and hydraulics; the civil engineer specializing in irrigation systems will be concerned with hydraulics, soils mechanics, and structural design; the mechanical engineer working with atomic research must develop new materials and resolve unprecedented problems in thermo-dynamics.

These examples clearly indicate that the grades for specialist positions will run on beyond Grade 6 to the top of the scale, or even higher into contract work. However, they may still be related to the basic grade scale to provide some guidance in classifying them.

Specialist positions at Grades 5 and 6 may be fairly described as *operational* as distinguished from *research* at Grade 7 and up. Such operational positions can be defined as those in organizations engaged in established programs of production or operational character; and there they can be described in terms of well-defined duties to be performed regardless of who may be assigned to do them. But when one gets beyond such operations and into the complexity of planning and research, the description of duties gives way to definition of objectives; and positions begin to become synonomous with the persons filling them. Then classification of positions begins to yield to the evaluation of the contribution made by the occupants.

Recapitulation

In brief, fairly concrete definitions can be drawn for Grades 5 and 6 as applied to supervisory and staff positions; and these definitions can be expressed by the adjectives "senior" and "principal" (or "chief") before the professional title. But for specialist positions, and for all positions above Grade 6, it becomes progressively harder to define the nature of a position except in terms of the performance of the occupant; and grading of such positions becomes more a matter of assessing personal worth than of applying a formal classification system.

Definition and Use of Grades 7 and 8—Executive Engineers

Applying the conclusions drawn in the recapitulation above, there is little point in attempting further definition of grade levels for staff and specialists positions. This does not mean that these positions do not require classification consideration to assure sound management control over pay and personnel appointments. It only means that these positions will be classified, not in terms of any predetermined grade definitions, but by internal alignment. This alignment will be attained by the same analysis and evaluation of relative difficulty and responsibility as discussed throughout this book. But all theoretical classification systems notwithstanding, in such evaluation the capabilities of the person become identical with the character of the position—the position becomes whatever the incumbent makes it.

Supervisory positions, however, still lend themselves to some objective grade definitions at these higher levels; and a fairly clear line can be drawn between Grade 6 and below, and Grade 7 and above. Below this line are the managerial-professional positions defined previously as being oriented to the professional requirements of the work. Above this line are the executive positions, in which the executive requirements predominate over the professional; and in which the span of control extends to multiple responsibilities frequently involving professions and major occupations other than the one from which the executive advanced. For example, the head of an engineering organization becomes involved in directing activities in multiple engineering fields, and additionally gives a major portion of his attention to organization, finance, sales, and similar non-engineering functions.

Artificial distinctions could be drawn between Grades 7 and 8, and between these and such top executive positions as covered by the "super" grades in the Federal scale. But such distinctions would be artificial and useless. In the Federal service these grades are applied to agency heads and similar positions by internal alignment within the agencies and by cross comparison of program complexity and responsibility from agency to agency. This must be done by a central authority in a position to know the program of all agencies. It has been done so far by the Civil Service Commission for agencies under the Classification Act and by Congress in legislative authorities for other agencies. In private corporations it will be done by boards of directors or similar authorities, and will be of little concern to officials applying any classification system to rank-and-file positions.—***End.***

About the Author . . .

Mr. Bamberg

John Bamberg has been in position classification and pay administration since 1941, starting with the U. S. Army Engineers and now with the Bureau of Reclamation, Department of the Interior. Formerly he worked in personnel training with the Tennessee Valley Authority on the Joe Wheeler Dam and Guntersville Dam construction jobs.

He attended the University of Tennessee and Peabody College, minoring in science which he taught for three years. His association with engineering and construction work began, he reports, "with saw and hammer" on building construction.

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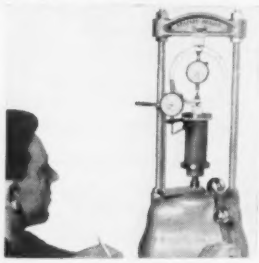
HAND OPERATED COMPRESSION TESTER — Item 1



A new type hand operated unconfined compression apparatus that can be used in making field or laboratory tests of soils has been developed by Soiltest, Inc. Compact, portable and easy to operate. Developed to meet the requirements of practicing engineers and contractors as well as laboratory investigators in the field of Soil Mechanics. Can also be used for testing other materials such as ceramics, wood and plastic parts, metals, small paper boxes, etc.

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Please send information on Item 2 to:

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SIMPLIFIES METAL LAMINATIONS — Item 2

A new transparent, double faced "Mylar" tape, especially suited for various laminating and splicing applications, is available from the Permacel Tape Corp. Permacel 94 is backed with a 1 mil "Mylar" film and uses a rubber base, pressure sensitive heat curing adhesive. Practicable for laminating transparent sheets of all types of material, for laminating dissimilar metals, or even like metals, where paper or cloth backings would not be desirable. It is especially suitable for laminating when resistance to aging, low moisture vapor permeability, resistance to solvents, and a not too bulky end product are desired.

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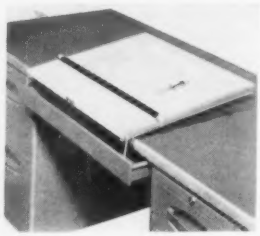
FOLDAWAY DRAWING BOARD — Item 3



Arnot Foldaway Drawing Board tucks away in a center drawer beneath desk or table and slides out at a moment's notice. Self-contained suspension fixtures equipped with nylon roller tracks assure smooth gliding of the drawer. The drawing board itself, attached to the drawer by specially-designed hinges moves easily into position on the desk top at a comfortable working slope. Comes in two sizes.

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MATERIAL SPREADER — Item 4

A new, improved material spreader that can be used for salt, sand and cinders has been announced by The Fairfield Engineering Co. Features simplicity of installation, as well as ease of operation. Fits any standard 3 cu. yd. dump body tail gate, and can be installed in a short time. Complete controls are located in the truck cab and operated by the driver. Readily adjustable baffles are provided at the distributor disc to control spread width. More material can be thrown forward to obtain better traction by removing the front baffle.

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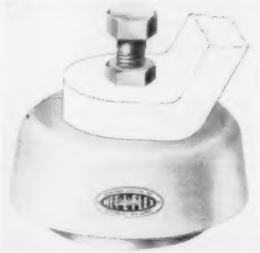
ADJUSTABLE ALL-METAL MOUNT — Item 5



Adjust-O-Mount, W339, a new, all-metal mount for protection against vibration and the control of shock for such machines as presses, grinders, millers, lathes and many other machine tools, is the latest addition by Robinson Aviation, Inc. Has an increased load carrying capacity in three models ranging from 1000-10,000 lbs. per unit without any necessity for change in the compact housing dimensions. A lower natural frequency of 7-10 cycles per second is said to make absorption of vibration shock and noise more complete.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

POLYETHYLENE PROTECTION — Item 6

In addition to acting as a moisture and vapor barrier, polyethylene film sheets by Olin Mathieson Chemical Corp. have proven useful to builders in a number of other ways: When used to close in a building, it protects workers from cold, rain and snow and permits the job to continue under adverse weather conditions. Protects materials and equipment. Helps cure cement or brick work, preventing rapid moisture loss. Many other advantages.

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FOR SELECTION OF INDUSTRIAL PAINTS — Item 7

Statistical evaluation and selection of protective coatings is said to be possible by a system recently developed. All-Coat Engineered Coating System permits selection of optimum type of topcoat, primer and surface preparation specification, which under given environments and contemplated maintenance procedures, results in the lowest maintenance cost for an indefinite time. The resultant selection is based on a summation of all factors which affect the total cost of a system including chemical resistance, surface preparation, thickness, labor, aging properties, coverage, cost, and adhesion.

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Please send information on Item 7 to:

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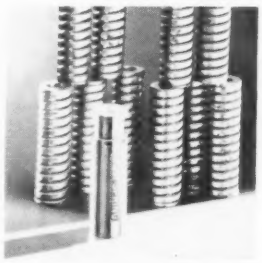
LIQUID DIE SPRING — Item 8

A new liquid die spring using liquid compressibility has just been announced by Taylor Devices Inc. Designed to replace existing heavy duty coil springs in dies. Through the use of a novel internal hydraulic levering principle, they are said to develop with an identical or greater stroke up to ten times the force of a standard heavy duty coil spring of the same diameter and length. Preloaded and completely self-contained.



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Please send information on Item 8 to:

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HIGH-SPEED VIBRATING SCREEN — Item 9

A new high-speed vibrating screen said to be 30 to 80 per cent faster than previous mechanical screens has been developed by Hewitt-Robins, Inc., for the fine screening of such materials as sand, clay, fertilizers, chemicals, coke, coal, etc. Has a speed of 3300 RPM when set for a 1/32 in. stroke and 2400 RPM when operating on a 1/16 in. stroke. Represents a completely new design featuring several important engineering advances, including a new lubricating technique in which atomized oil is injected under pressure into bearings in the form of a fine airborne mist. Called the "HS Vibrex." Designed for use with screen cloth of 10 to 80 openings per lineal inch. Wet or dry materials can be screened.

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Please send information on Item 9 to:

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HYDRAULICALLY POWERED DRILLING — Item 10

Mobile Drill Model B-40, engineered to operate as a core or auger drill, the B-40 may be adapted for tractors and vehicles or independently driven by a motor mounted at the rear of any vehicle. For hard formations, either air or water may be used with hollow-stem augers. Cores to 200 ft. and augers to 75 ft. Said to be ideal for under-road boring as well as nearly every exploratory job. One-man operated, it can be converted easily to drill at any degree in a 360° angle.

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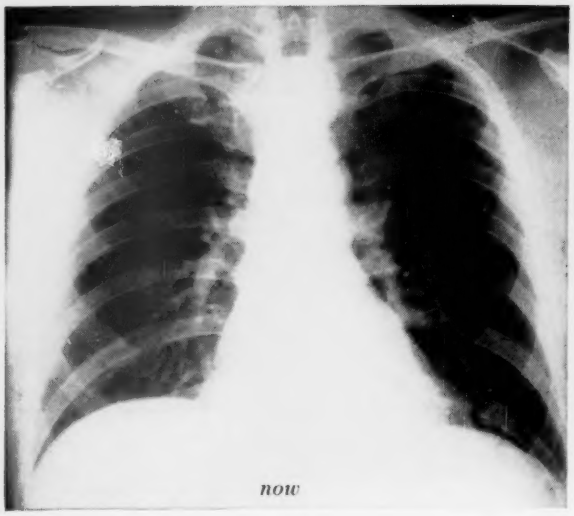
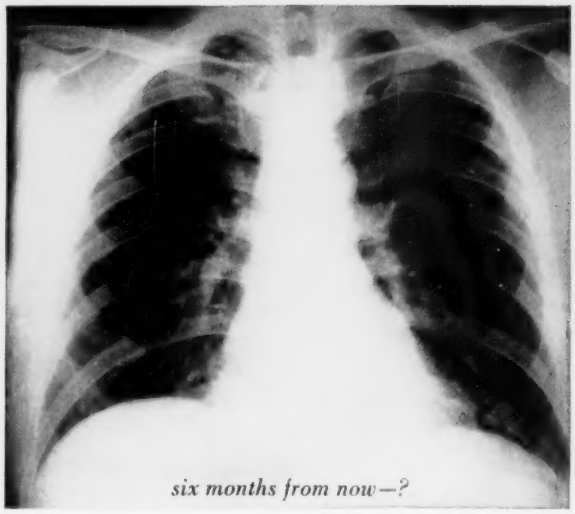


now



six months from now—?

TWICE A YEAR

MEN OVER 45!...Lung cancer, in men of your age, has increased so alarmingly in recent years that our doctors strongly recommend that you make a habit of having *two* chest x-rays every year: one, when you get your annual medical checkup; the other six months later.

Today, you are six times more likely to develop lung cancer than a man of your age twenty years ago. Our doctors still don't know *why* you are, but they *do* know that their chances of saving your life could be as much as ten times greater if they could only detect lung cancer "before it talks"...before you notice any symptoms whatsoever in yourself.

That's why we urge you and every man over forty-five to make semiannual chest x-rays a habit —for *life*.

To see our lifesaving film, "The Warning Shadow," call the American Cancer Society office nearest you or simply write to "Cancer" in care of your local Post Office.

American Cancer Society